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ARTICLE I.—*Liriodendrine, or the Bitter Principle of the Liriodendron Tulipifera; Tulip Tree or American Poplar.* By John P. Emmet, Professor of Chemistry and *Materia Medica* in the University of Virginia.

[Read before the College, February 1831.]

AS this substance appears to have every claim to be considered a new and very well characterised proximate principle, and inasmuch as it exhibits no alkaline or acid properties, it will, in conformity with the prevailing practice, be described under the name of *Liriodendrine*. The decoction made from the bark of the tulip tree yields an abundant precipitate upon the addition of aqua ammoniæ, the caustic fixed alkalies, or their carbonates, and at the same time the solution loses its intense bitterness. This circumstance induced me to examine, more particularly, the substance thrown down, and although the result has shown the absence of an organic alkali, it led me to the discovery of a substance, interesting not only for its medical properties, but for its chemical habi-

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tudes. The Liriodendrine is indeed a very peculiar body, and it is not at all singular that hitherto it has passed for a resin. When not crystallized, but simply fused, the general resemblance is very great; but in its chemical properties it differs from every other substance with which I am acquainted.

The bark of the tulip tree, it is well known, has long been in use as a tonic and febrifuge, yet it must be admitted that its administration hitherto has failed to secure to it the reputation of an uniform and active medicine. Without assigning to the Liriodendrine more efficacy than exists in the bark itself, I am of opinion that its properties will readily account for much of this want of uniformity. A temperature of about 270° F. is sufficient to volatilize rapidly this bitter principle, and at the same time partly to decompose it. This circumstance struck me very forcibly before I succeeded in obtaining the Liriodendrine crystallized. An infusion or decoction of the bark has a hot and very bitter taste, leaving an impression upon the tongue similar to that produced by the canella alba, yet, when the solution is freely evaporated to dryness, these properties become so much impaired, that the residuary matter seems to be almost tasteless. Hence, so far from its being possible to form an extract from the *Liriodendron Tulipifera* by the usual process, it seems impracticable to boil the bark with water in covered vessels without effecting the decomposition of the active principle.

Mode of preparing Liriodendrine.—All the soluble salts, when added in sufficient quantity to saturate the aqueous solution of the bark, seem to occasion the precipitation of this substance; but as it is rendered soluble by the presence of colouring matter, it will be more completely displaced by the addition of some active bases, as the alkalies and earths. The objection to the use of the former is that the pectic acid, which abounds in the fresh bark, forms gelatinous salts, which interfere with the subsequent filtration; and when lime or magnesia is employed, it is difficult to effect a complete decomposition within the bark. The fol-

lowing I found to be a much more convenient process. The bark is to be stripped from the roots, dried, and finely pulverized; it is then to be steeped for several hours in cold alcohol. The fluid, when saturated, is to be removed, and fresh portions added until the bark becomes exhausted. By employing the alcohol hot, and straining forcibly through a strong cloth, this result will be accomplished, after three or four repetitions. The alcoholic solutions are next to be filtered, and transferred to a large retort, or alembic, and heated until at least two-thirds of the fluid have been recovered by distillation. Towards the end of the process, the impure Liriodendrine will separate, and collect at the bottom in large semi-fluid masses; it may be readily obtained by pouring out the contents of the vessel, and allowing the whole to cool. The remaining liquid is then to be gently evaporated in an open vessel, until it assumes the consistency of honey. The temperature should not exceed 200° F. This dark resinous looking mass is to be incorporated with the portion which separates during the distillation, and then triturated with a warm solution of caustic potassa, soda, or aqua ammoniæ. The alkalies remove a large quantity of colouring matter, and the Liriodendrine, being insoluble, separates, and may be brought together by a spatula. This treatment with caustic alkali must continue until the solution passes off colourless. The Liriodendrine in this state has a drab colour (which becomes lighter by exposure to soft water) and a waxy lustre. At a temperature of 30° or 40° it is hard and brittle, but softens in the hand, and bears a close resemblance to putty.

It appears, from an examination made upon a small scale, that the recent bark taken from the root, and dried at a temperature of 70° F., loses, by the repeated action of alcohol (holding 11 per cent of water, according to the centesimal alcohometer of Gay Lussac), as much as 40 per cent. Of this amount the Liriodendrine composes more than 7 per cent; but it was not easy to determine the exact proportion, inasmuch as the alkaline solutions always carry off a portion,

I incline to believe that, on a large scale, it will be found more convenient to boil the impure tincture of the bark with calcined magnesia until the fluid assumes an olive green colour. It may then be concentrated by distillation, until it appears turbid, and in this state, when removed and gradually mixed with cold water (the fluids being agitated at each addition), the Liriodendrine readily precipitates as a white powder, or, by repose, will separate in the crystalline state.

The peculiarities of this substance prevent us from obtaining it crystallized from *hot* concentrated alcoholic solutions. In this particular Liriodendrine differs essentially from salicine and the bitter vegetable principles hitherto described. If such a solution be examined with an eye glass, it will appear saturated with exceedingly minute globules of an olive green colour, but there will be no indications of crystallization even after spontaneous evaporation; the Liriodendrine merely separates as a transparent varnish; water seems necessary for its crystallization, and in this state there is great reason for believing that it is a *hydrate*. The water, however, should be added gradually until the colour of the solution becomes pearl white, and the temperature should be as low as 40° or 50°. The crystals obtained in this manner and by spontaneous evaporation are very pure; but always present different forms, among which may be observed triangular and rhomboidal plates, interspersed with plumose or stellated prisms; some of them are perfectly limpid, while others have the micaceous appearance of boracic acid. As the Liriodendrine may be washed with cold alkaline and acid solutions, without any loss, it is evident that it admits of complete purification.

The difference between *Liriodendrine* in its crystalline and fused states is very striking; crystallized, it freely dissolves in alcohol, forming a *colourless solution*, which readily furnishes crystals by spontaneous evaporation, and without the necessity of adding water; when gently heated, the crystals fuse, slightly effervesce (owing to the escape of

water), and then become olive coloured, without any appearance of crystallization upon cooling. In the fused state, on the other hand, the alcoholic solution is always olive green, and scarcely gives any indication of a regularly formed deposition, unless the alcohol employed is dilute.

The alcoholic solutions of both varieties possess an intensely bitter taste, but always leave the impression of heat upon the tongue. Perhaps the combination of these properties may add to its value as an article of the *materia medica*; they seem at all events to be characteristic of the Liriodendrine in its purest state. The proper solvent for this substance is sulphuric ether.

In addition to the foregoing, it will here be proper to add the following remarks. Crystallized Liriodendrine is solid, brittle, and inodorous at 40° , fusible at 180° , and volatile at 270° F. When carefully heated in a glass tube closed at one end, it gives off a white vapour, which condenses again, without signs of crystallization, and is the Liriodendrine unaltered. But it is impossible, even with the utmost care, to effect the complete sublimation of this substance. About one half of it remains and appears to consist of a solid brittle resin. I could discover no trace of benzoic acid or of ammonia in the sublimed portion, even when the temperature was raised so as to effect the decomposition of the Liriodendrine. The vapour is aromatic and indicative of the plant.

Weak acid or alkaline solutions have no other effect upon this substance than to occasion its complete precipitation from dilute alcohol; but the case is quite different when the Liriodendrine is exposed to these bodies in a concentrated state. Thus,

Caustic potassa or soda, dissolved in a small quantity of water and boiled with the crystals, appears to convert them into oxalic acid. In this respect Liriodendrine differs materially from the resins.

Cold concentrated sulphuric acid dissolves, and at the same time decomposes it with the greatest facility, forming

a yellow or orange red solution, according to the quantity employed. Upon diluting the acid, a white matter separates.

Cold concentrated nitric acid dissolves the crystals rapidly, without in the least discolouring them, and the solution is effected without the escape of any gaseous matter. The acid may be even gently evaporated, and the Liriodendrine recovered without any material alteration. Boiling the acid produces complete decomposition, and a yellow resinous matter remains.

Cold concentrated muriatic acid has little or no action; but, when heated, the Liriodendrine effervesces and assumes a deep emerald green colour. A small portion, however, seems to escape decomposition, and may be precipitated from the acid by the addition of water.

Iodine, in substance, almost immediately imparts to the crystals a bright chrome yellow colour, and, in the end, forms an insoluble matter, which retains a grass green colour after all the excess of iodine has been removed by a gentle heat. This is, no doubt, a definite compound; for it assumes its original yellow tint when water or alcohol is added. In this state, also, the Liriodendrine is scarcely soluble in alcohol. Although the colour produced by iodine is not so intense as that resulting from the action of the same substance upon boiled starch, it appears to be no less characteristic of small quantities; for, notwithstanding the almost complete insolubility of the Liriodendrine in cold water, if a particle of the iodine be placed upon the surface of this very weak solution, it very soon becomes surrounded by an opaque yellow film. This compound is immediately decomposed by nitric acid, which liberates the iodine and dissolves the Liriodendrine.

Chlorine and bromine produced no marked effects upon this bitter principle. Both in its fused and crystallized state it is heavier than water, at the ordinary temperature; but as the fluid approaches the boiling point, it floats upon the surface.

When the crystals are thrown upon a burning coal, they

melt and volatilize in an instant without undergoing combustion ; but when touched by a fragment of warm spongy platinum, they become absorbed and then may be kindled by a candle ; they burn with a brilliant white flame, giving much soot, like resins and oils.

When Liriodendrine is fused, it bears a close resemblance to a soft resin; in this state, also, it seems to be incapable of crystallizing; but its volatility, very low point of fusion, incapacity to unite without decomposition with the alkalies, extremely bitter taste, and the definite combination which it seems capable of forming with water, all exhibit a very marked difference between it and any resin with which we are acquainted. I attempted, in vain, to form a crystalline hydrate of common resin, (it always separated in transparent globules), and, as we have no satisfactory evidence that resins ever occur crystallized, this condition of the Liriodendrine may be regarded as alone sufficiently distinctive. It is true that M. Pelletier states his having seen the balsam of copaiba in a crystalline form ; but the article, besides being of a compound nature, was at least thirty years old at the time of observation.

To conclude, I may observe that the properties of *Liriodendrine* seem to place it with camphor, as a connecting link between the resins and volatile oils.

ART. II.—*On the Liriodendron Tulipifera, American Poplar or Tulip Tree.* By Benjamin Ellis, M.D.

Our readers will perceive by the preceding essay that this tree has acquired an increased interest, from the discovery of a new organic principle in the bark of its root, by professor Emmet of the University of Virginia. This circumstance has induced us to furnish a brief sketch of its natural histo-

ry, accompanied with a plate, with the view of rendering more complete the very interesting article on "*Liriodendrine*."

The tulip tree may indeed be called the pride of the American forest; noble in all its dimensions, attaining an altitude of from seventy-five to one hundred feet, and measuring from two to five feet in diameter. It is surpassed by few or none in the richness of its foliage, the beauty of its flowers, the uniform straightness of its trunk, and the regular disposition of its branches; its wood is abundantly employed in the arts and in rural and domestic economy, and its bark has been highly extolled as a remedy in fever and some other diseases. It is known by different names in different parts of the country; such as, white wood, canoe wood, American poplar, American tulip tree, tulip bearing poplar, &c. The term tulip tree is obviously the most proper, from the palpable resemblance of its flowers to the garden tulip, and it is to be wished, for the sake of avoiding confusion, that this name were universal; but American poplar is by far the most common throughout the United States. According to Michaux, the northern limit of this tree may be placed at the southern extremity of Lake Champlain, in lat. 45° , and it seldom extends further east than the Connecticut river, in long. 72° . From these points it is widely diffused to the south and west, attaining its greatest degree of development and perfection in the rich bottom lands of the western states; it is generally found mingled with other trees, such as the hickory, black walnut, butternut, wild cherry tree, &c., but sometimes it was observed by Michaux to constitute pretty large tracts of forest in Kentucky, where he found this tree larger than in any other part of the United States.

Its vegetation is repressed in the colder climates of the northern states; and in the eastern parts of the Carolinas and Georgia it does not flourish well, owing to the nature of the soil, which is either too dry and sterile, as in the *pine barrens*, or too wet, as in the *swamps*. "The genus

Liriodendron, to which Linnæus has assigned four species of trees, is characterised by a *double calyx*; *the outer of two, the inner of three leaves; petals six; seeds imbricated into a cone.* The species *tulipifera*, the only one in America, is remarkably distinguished by its *lobed and truncated leaves*; together with several other of our finest flowering trees and shrubs, the Liriodendron is found in the class *polyandria*, and order *polygynia*, and the natural orders *coadunatæ* of Linnæus, and *magnoliæ* of Jussieu." In the structure of its buds and the development of its leaves it is no less peculiar than in their outline; each leaf-bud is composed of scales closely applied upon each other, and it forms an oval sack, in which is enclosed the young leaf, to be unfolded as it acquires sufficient maturity to bear exposure to the light and air; several sacks are thus embraced, one within the other, which swell, burst, and evolve the leaves in succession, so that from one original or principal sack, five or six leaves will unfold on young and vigorous trees.

These sacks or sheaths swell to a large size before bursting, and the remains of them, being converted into *stipulæ*, continue attached to the leaves until they are half-grown. In the warm and damp weather of our spring these leaves grow very rapidly, and acquire a breadth of six or eight inches. They are supported on long petioles, alternate, somewhat fleshy, very smooth, and of a bright green colour; in form, as before observed, they are altogether peculiar, and are a distinguishing feature of the tree. They are divided into three lobes, of which the middle one is horizontally notched at its summit, which gives it the appearance of being four-lobed; and the truncated extremity, which gives to the leaf its singularity, bears considerable resemblance to the tail of a fish. The two lower lobes are rounded at the base, and in the larger leaves they are furnished with a tooth or additional lobe on the outside.

There is one variety of this tree whose leaves are not pointed, but very obtuse.

The flowers are bell shaped, large, brilliant, and on de-

tached trees very numerous. They are variegated with different colours, among which the shades of yellow predominate, and they are in common seasons fully expanded about the middle of May. Their odour, though faint, is agreeable, and they produce a singularly beautiful effect when surrounded with the luxuriant foliage of this magnificent tree.

"The outer calyx has two triangular leaves, which fall off as the flower expands ; the inner calyx consists of three large, oval, concave, veined leaves of a green colour, spreading at first, but afterwards reflexed. Petals six, sometimes more, obtuse, concave, veined of a pale yellowish green, marked with an irregular indented crescent, of a bright orange on both sides, towards the base.

"Stamens numerous, with long linear anthers opening outwardly, and short filaments ; pistil, a large conical acute body, its upper half covered with minute, blackish, recurved stigmas, its lower furrowed, being a mass of coalescing styles and germs."

The fruit is a cone of two or three inches in length, formed of a great number of very thin narrow scales, attached to a common axis, and pointed at the summit. Each of these, when well filled, consists of sixty or seventy seeds, of which never more than one third, and some seasons not more than seven or eight of the whole number are productive. It is stated that all of these seeds prove abortive for the first ten years, and even after the trees have attained that age, the seeds from the summit branches of the large ones possess the power of germinating in the greatest perfection.

Until the diameter of the tulip tree exceeds seven or eight inches, the bark is smooth, even, and of a brownish colour ; afterwards it cracks, and the depth of these fissures, and the thickness of the bark, are in proportion to the age and size of the tree. The branches, which are not very numerous, when of one summer's growth, are pithy and of a shining blue colour ; those of two seasons old are covered with a smooth brown bark, and, when broken, emit a strong but rather agreeable odour.

The bark of the trunk, branches and root, is brought to our druggists by those who derive a slender revenue from collecting our indigenous articles of the *materia medica*. That from the tree and limbs is in pieces of three or four inches long, deprived of its epidermis, of a yellowish white colour, very light, and easily broken. The taste is pungent and aromatic, somewhat camphoraceous, bitter and very slightly astringent. That from the root comes in irregular pieces, three or four lines in thickness, rather browner than the preceding, and partially stripped of its epidermis.

When drying it gives off a heavy and not very agreeable odour; the taste is perhaps more heating and aromatic than in that taken from the tree, and it is rapidly diffused over the tongue and fauces, leaving a tolerably permanent impression of warmth in the mouth.

The tincture of the bark of the root is of an orange yellow with a shade of red, not very unlike the colour of Teneriffe wine; the taste in a high degree warm, bitter, aromatic and penetrating. The odour of the alcohol conceals that of the bark. The colour of the aqueous infusion resembles that of the spirituous, but is rather paler; the smell is more perceptible, but the taste is more feeble, and not very agreeable.

The bark of the *Liriodendron* has long enjoyed some reputation as a remedy in the cure of intermittent and other forms of fever, as well as in rheumatism, dyspepsia, &c. It is probably much more frequently used in domestic than in regular practice. By Dr Young, formerly of Philadelphia, it was strongly recommended in a letter addressed to Gov. Clayton of Delaware, which was published in the *American Museum* for December 1792.

The latter gentleman in reply, remarked that he considered it more bitter and aromatic, though less astringent, than the Peruvian bark, and found it, combined with the barks of the dog wood and white oak, beneficial in every case to which the *cinchona* was applicable. The specimens I have

tasted do not certainly manifest this striking bitterness, and the superiority which he ascribes to it in this respect over the bark of Peru, can only be accounted for by the fact, that it is only a few years since the physicians of this country were acquainted with more than one kind of cinchona, and that was the Carthagena bark, an article now justly esteemed nearly worthless.

Dr Young ascribes to it great efficacy as a febrifuge; as a remedy in consumption, dyspepsia, hysteria (combined with laudanum), cholera infantum, and finally as a vermifuge. For the latter purpose, we are informed, the infusion is given in large quantities to horses in some parts of the country. Sometimes it excites vomiting, and cannot be borne without the addition of laudanum; at others it operates as a cathartic. It should never be given in acute diseases, before the excitement has been subdued by proper depletion. As the active properties of this bark evidently depend on a volatile principle, it loses its virtues by time, and should therefore be kept secluded from the air, and collected annually for medicinal purposes. The bark of the roots is believed to be more energetic than that of the tree or branches, and the proper season for gathering it is in the winter, before the sap begins to circulate. Michaux states, that in Paris a spirituous liquor is made from the fresh bark of the poplar roots, with the addition of a sufficient quantity of sugar to render it agreeable.

The dried or recent leaves steeped in boiling water are considered by some as a specific in the cure of inflammation of the jaw and face, and I have been assured that the relief procured by this kind of fomentation was very prompt and complete.

The bark is introduced into the *materia medica* of the United States *Pharmacopœia*, but it has no officinal preparations.

It may be given in the form of tincture, infusion or powder. The latter is considered the most efficacious, and its superiority over the aqueous preparations has been

accounted for by professor Emmet. The dose in substance may be from 9j to 3ij.

The colour and quality of the wood of the tulip tree are said to be greatly influenced by the nature of the soil and the kind of exposure. From the appearance of the wood, it is distinguished by the names of white and yellow poplar by the mechanics; and although there are some general features by which a practised eye can judge with tolerable accuracy between the two while standing, yet the difference can only be ascertained with certainty by cutting into the trees.

The wood of the white poplar is of a coarser grain, harder, and the yellow heart bears a much smaller proportion to the sap than in the yellow variety. It is consequently much less valuable for the purposes of the mechanic, and is subject to decay more rapidly. This tree has been transplanted to Europe, and is carefully cultivated as a rare ornament of the park and pleasure grounds. It flourished well both in England and on the continent, and is highly valued for the attractions it possesses, in the beauty of its flowers and foliage, in its magnitude and utility.

ART. III.—*On Ichthyocolla.* By Daniel B. Smith.

The swimming bladder, with which most fishes are furnished, is an important and valuable material in the arts, and deserving of more attention than it has yet received from the fishermen of our coasts. This bladder or air bag is placed in the anterior part of the abdominal cavity, and adheres to the spine. Its use in the vital economy of fishes is not fully understood. By some it is supposed that the fish has the power of contracting or expanding it so as to enable

it to sink or rise in the water. By others it is considered as a reservoir of air, secreted by the blood into this organ, to be thrown out again into the system for the support of life. This opinion has received some colour from the experiments of Biot upon the air contained in the bladders of fishes caught at various depths in the ocean. It was found to consist of oxygen and nitrogen in various proportions. In the common mullet (*mugil cephalus*) the quantity of oxygen was insensible; while in a fish called the piper (*trigla lyra*) it constituted eighty-seven per cent of the mixture. The proportion of oxygen was found to increase with the depth at which the fish was caught.

The air bladder in most fishes communicates with the stomach or with the cesophagus by means of a duct, which, in the sturgeon, is nearly an inch in diameter. In the cod, the haddock and some other fishes, no communication has been discovered between the two, and in these cases the surface of the air bladder is attached to a red coloured organ consisting of a great number of folded or doubled membranes. In those fishes which possess the duct spoken of, this red substance is either very small or entirely wanting. The shape of the air bag varies according to the species. "In the herring and some other fishes it is oblong and pointed at both ends. In the salmon it is obtuse at both ends. In the turbot it is obtuse in the lower end, and bifid at its superior extremity. In the carp it is divided transversely, and in the silurus longitudinally into two lobes."

The bladder is entirely wanting in the cartilaginous fishes with fixed bronchiæ, which include the lamprey, the shark, the ray fish and the saw fish, and in some osseous fishes, as the flounder and the mackerel.

This organ consists almost entirely of pure gelatine, containing only about three per cent of earthy salts. The greater part of the isinglass found in commerce is furnished by the Russians, and the best is prepared from the air bladders of sturgeons caught in the Caspian sea and its tributary streams. There are four species of this genus found in the

Caspian sea, viz. the common sturgeon, *Acipenser sturio*; the sterlet, *A. ruthenus*; the starred sturgeon, *A. stellatus*; and the beluga of the Russians, *A. huso*. From three hundred thousand to four hundred thousand of the first named species are caught in a year. The second is prized as the greatest delicacy for the table; but the best isinglass is made from the *A. stellatus*, of which a million and a half, valued at seven hundred thousand dollars, are sometimes taken in a year. The beluga attains an enormous size; one of them being sometimes a sufficient load for three horses. One hundred thousand of this species have been caught in a year.

In preparing the isinglass, the sounds are taken from the fish while fresh and sweet, cut open, washed, and well cleaned from the surrounding membranes. They are then exposed to stiffen a little in the air, and formed into rolls about the thickness of a finger. The extremities of the roll are turned inward and pinned together with a small wooden peg, and the proper shape given to the *staple* with the finger. It is then laid on boards or hung up in the air to dry. The book isinglass is made from the thicker membranes, which are not easily worked into the form of staples. The staple isinglass was formerly accounted the best, but much inferior isinglass of that kind has latterly been brought to this country, and the fine book sort is now in much esteem. The finest membranes exhibit a beautiful opalescence when held in certain positions. The ordinary book and staple isinglass are said to be made of the intestines and peritoneum of the fish. A still inferior kind, called cake isinglass, is made by melting the fragments and scraps of the other sorts in water, and drying them in a pan. We have sometimes met with this sort rolled into small globular masses.

The sounds of the cod (*gadus morhua*) and the ling (*gadus molva*) also furnish isinglass of a good quality; although they are principally used for salting, as an article of food. As it is difficult to separate them from the spine, the fishermen throw that part of the back-bone which is cut off

previous to salting the fish, into heaps, which are left for a few days, after which the sounds are readily separated. The Iceland fishermen beat the bones on a block with a thick stick, in order to separate the sound entire. If the sounds have been cured by salting, they must be steeped in fresh water, until the salt is washed out, before they can be used for making isinglass. In order to use them for isinglass the membrane must be well scraped on both sides, steeped for a few minutes in lime water to absorb the oil, then washed in clean water and dried. The isinglass thus made is little inferior to the Russian; although in using it for clarifying liquors, it falls more speedily and compactly to the bottom.

Tooke, in his survey of the Russian empire, says, that the air bladder of the *shad* is much used for making an isinglass of an inferior quality.

The *didion atinga*, a species of the globe fish or sea hedge-hog—a native of the tropical seas, furnishes an isinglass equal in quality to that obtained from the *acipenser huso*.

The air bag of the *silurus glanis* also furnishes an excellent isinglass. This silurus is a large fish, which sometimes attains the length of fifteen feet, and inhabits the larger rivers of the old continent. It belongs to the same division, and was formerly included in the same genus with the catfishes (*pi-milodes*) of the Ohio and Atlantic rivers.

An isinglass of a good quality is likewise said to be made from the skins of some of the species of the perch (*perea*.)

In addition to the book and staple isinglass imported from Russia, there are several other varieties of this drug found in our market.

The air bladder of a large fish, which is unknown to me, is brought from Brazil, from which country it is said to be an article of extensive exportation. It is simply dried without altering the natural shape of the bag, which is oblong, tapering and pointed at one end and bifid at the other, from which also proceeds the pneumatic duct that connects the

bladder with the stomach or œsophagus. These bags are from five to eight inches in length, and weigh from two to four ounces and upwards. The quality of the isinglass is said to be very good, and it is much used in fining liquors.

An isinglass of inferior price and quality is prepared on the coast of New England, which has been much used in this country. It is in thin ribbands, several feet long, and from an inch and a half to two inches in width, and is evidently prepared from the intestines of a fish. It is less soluble than the Russian isinglass, and the glue which it forms is comparatively weak and dark coloured.

Within the last year or two, small quantities of isinglass of a very good quality have been furnished by the New York druggists. This sort is merely the dried sounds of the weak fish, and perhaps some other species which are caught in the harbour of New York. The air bladder is separated and dried in its natural shape, or merely cut open. It is probable from their appearance when dried that the bladders are obtained from several fishes, for they differ in texture and size, weighing from a drachm up to an ounce. This isinglass is very soluble, makes a strong clear jelly, and is furnished at a very reasonable price, much below that at which the imported drug can be sold.

It is much to be wished that more attention were paid to the development of the great resources of the United States in reference to this and other productions, which are now wasted. There are few objects more worthy of a premium at our great exhibitions of national industry, than the preparation of a certain quantity of good isinglass from the fishes of our rivers and seas. The cod, the sturgeon, the cat-fish, and even the shad and the herring which visit us in such innumerable shoals, could thus be made to furnish a new source of wealth, from what is now considered as worthless offals.

The works which have been chiefly consulted in compiling the above account, are the Edinburgh Encyclopedia,

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Art. Ichthyocolla; Malte Brun's Geography, Art. Caspian Sea; and a paper by Humphrey Jackson, Esq. in the 63d vol. of the Philosophical Transactions.

ART. IV.—*Dissertation upon the subject of Peruvian Bark.*
By George B. Wood, M.D.

As no generally accessible work exists in this country, containing a satisfactory account of Peruvian Bark in its relations to natural history, commerce, and pharmacy, a condensed treatise on the subject may be acceptable if not useful to the readers of this Journal. The following remarks do not profess to embrace all that can be said on a theme so fruitful. The object is to give a general view of the present state of knowledge in reference to this highly important medicine, with such particulars of its history as may seem most deserving of notice; and it is intended that nothing shall be overlooked which is likely to be of peculiar interest to the pharmacist. A consideration of its medical powers and application to the treatment of disease, belongs to a different profession. The remarks, which it is proposed to make, may be included under the three heads of its botanical, commercial, and pharmaceutic history: in the present number, those only will be given which belong to the botanical department.

Though the use of Peruvian Bark was introduced into Europe so early as 1640, it was not until the year 1737 that the plant which produced it was known to naturalists. In that year, La Condamine, one of the French Academists who were sent into South America to make observations relative to the figure of the earth, on his journey to Lima, through the province of Loxa, had an opportunity of examining the

tree, of which, upon his return, he published a description in the Memoirs of the Academy. Soon afterwards Linnæus gave it the name of *Cinchona officinalis*, in honour of the countess of Chinchon, who is said to have first taken it to Europe; but in his description of the plant he is stated by Humboldt to have united the species discovered by La Condamine with the *C. pubescens*, a specimen of which had been sent him from Santa Fe de Bogota. For a long time botanists were ignorant that more than one species of this genus existed, and the *C. officinalis* continued till a comparatively recent date to be recognised by the Pharmacopœias as the only source of the Peruvian Bark of commerce. A plant was at length discovered in Jamaica, having the generic characters of the Cinchona as then established, and received the title of *C. Caribæa*. Analogous species were afterwards met with in various parts of the West Indies; Forster found one in the island of Tongataboo in the South Pacific; Roxburgh another on the Coromandel Coast of Hindostan; Nec a third in the Philippines; many new species were discovered in various parts of New Granada and Peru by Mutis, Zea, Ruiz and Pavon, Humboldt and Bonpland, and Tafalla; several Brazilian plants appeared to certain botanists worthy of ranking in the same genus; and even the southern portion of our own country, and the distant isles of Bourbon and Mauritius were made to burthen with their productions the already greatly overloaded catalogue. Not less than forty-six different plants have, by various authors, been brought under the genus *Cinchona*; and the number would be greatly augmented were we to admit as distinct species all the varieties for which this rank is claimed by one or another botanist. But in thus throwing together the productions of so many and such distant climates, botanists compelled an association which nature never intended, which many authors, indeed, have never acquiesced in, and which is now dissolved by universal consent. Between some of the plants thus associated, there exists scarcely any resemblance in appearance, or habitudes, or medicinal properties; and a compara-

tively small number have been found to afford products, possessing the chemical characters which distinguish those of the genuine *Cinchona*. According to De Candolle there exists sufficient ground for distributing these various species into eight genera, viz. *Cinchona*, *Buena*, *Rimijia*, *Exostemma*, *Pinckneya*, *Hymenodyction*, *Luculia*, and *Danais*. They all belong to the class and order *Pentandria Monogynia*, natural order *Rubiaceæ* of Jussieu; and may be considered as constituting a distinct tribe of this family. The distinguishing botanical characters of these various genera are given in a paper by De Candolle, a translation of which was published in the last two numbers of this Journal. The *Cinchona* is confined exclusively to Colombia and Peru. The *Buena* includes two Peruvian and one Brazilian species, the former of which, before the change of name, were designated as the *Cinchona acuminata*, and *Cinchona obtusifolia*. The genus *Rimijia* was established by De Candolle, and embraces three shrubs of Brazil, which were ascribed by August. de St Hilaire to the *Cinchona*, and the bark of which is used as a febrifuge by the natives of the country. To the *Exostemma* belong the West India species, of which there are not less than nine, formerly known as the *Cinchona Caribæa*, *C. floribunda*, &c. To the same genus belong the former *Cinchona Philippica* of the Philippine islands, four species indigenous to Peru, and two discovered by M. de St Hilaire in Brazil. The *Pinckneya* consists of a single species inhabiting Georgia and South Carolina, discovered by Michaux the elder, and described in some botanical works by the name of *Cinchona Caroliniana*. The *Hymenodyction* is an East India genus, including the *Cinchona excelsa* of Roxburgh, found on the Coromandel Coast. The *Luculia* is also of the East Indies. The *Danais* inhabits Bourbon and the Isle of France. Of these various genera, the *Cinchona*, the *Buena* or *Cosmibuena* of Ruiz and Pavon, and the *Exostemma* have been most generally confounded. The last, however, is decidedly distinguished by the projection of the stamens beyond the corolla, a character expressed in the name of the genus.

The two former are still frequently combined by scientific writers. The Buena was originally suggested as a distinct genus by Ruiz and Pavon, has been recognised by De Candolle and some other writers, and appears to be sufficiently characterized. A botanical description of it may be seen by consulting the paper of De Candolle before alluded to. The genera, which have at various times been confounded with the true Cinchona, have been thus briefly noticed, because the barks of some of them have been substituted for the genuine febrifuge of Peru, and in the description of the false barks of commerce, there will be occasion to allude to them. I shall now proceed to consider the proper Cinchona.

It has been stated that La Condamine was the first botanist who had an opportunity of examining the cinchona tree. The species observed by him was in the vicinity of Loxa, and has subsequently received from Humboldt the name of *Condaminea*. In the year 1739, two years after the visit of La Condamine, Joseph de Jussieu was in the same neighbourhood, where he gathered numerous specimens which are still preserved in Jussieu's collection at Paris, and among which Humboldt recognised his own *C. Condaminea*, and the *C. pubescens* of Vahl. From the period at which Linnaeus drew up the description of his *C. officinalis* from a specimen of the latter species, the knowledge of botanists with regard to the Cinchona remained stationary till the year 1772, when Mutis, a Spanish physician, who had long resided in Santa Fe de Bogota, discovered cinchona trees upon the mountains in the neighbourhood of that city. Not less than four species were described by this author as inhabiting the vice royalty of New Granada. A few years afterwards other species of the same genus were discovered in the mountainous provinces to the north west of Lima, whither a botanical expedition had been sent by the Spanish government under the direction of Ruiz and Pavon, the celebrated authors of the *Flora Peruviana*. By these gentlemen, associated with Tafalla, not less than thirteen species were described, several of which, however, have been subsequently found to be

identical with one another, or mere varieties of some species before described. The country of the *Cinchona* was afterwards visited by Humboldt and Bonpland, whose personal researches resulted in the discovery of at least two new species, and by whom much light has been thrown upon the intricate subject of the botanical and commercial history of Peruvian Bark. Besides the botanists above mentioned, several others have at different times directed much attention to the natural history of this genus of plants, and by the examination of dried specimens, or by the critical acumen which they have carried into their investigations of the works of other botanists, have assisted in the determination of the several species. Among these may be mentioned Zea, the pupil and friend of Mutis; Lambert, vice president of the Linnean Society of London; Vahl, a distinguished Danish botanist; Bergen, author of a recent German work on the subject of Peruvian Bark; and the celebrated De Candolle, whose paper on *cinchona* in the *Bibliotheque Universelle* has attracted considerable attention. Laubert, a French physician of eminence, and Guibourt, a distinguished pharmacist of Paris, may be mentioned among those who have contributed to illustrate this difficult subject, rather, however, in the department of pharmacy than of botany.

It has been stated that the genuine *cinchona* trees are confined exclusively to the continent of South America. Within these limits, however, they are very widely diffused, extending from La Paz in the former vice royalty of Buenos Ayres, to the mountainous regions of Santa Martha on the northern coast. Those which yield the bark of commerce grow at various elevations on the Andes, seldom less than four thousand feet above the level of the sea, and require a temperature considerably lower than that which usually prevails in tropical countries.

There appears to have been much difficulty in arranging the plants belonging to this genus into their appropriate species; and botanists have not only differed among themselves on this point, but have, in some instances, exhibited a de-

gree of excitement unbecoming the dignity of science. Ruiz and Pavon, in the *Flora Peruviana*, describe thirteen new species, while Mutis reduced all those observed by him to seven, and professor Zea has attempted to prove that almost all the efficacious species of Ruiz and Pavon are reducible to the four described by Mutis in the year 1793, in the *Literary News of Santa Fe de Bogota*. It appears from the best testimony that the number of the species has been unnecessarily augmented by certain botanists, mere fugitive differences depending on peculiarities of situation or growth, having been exaggerated into permanent characteristics. One source of the difficulty of a proper discrimination is stated by Humboldt to be the varying shape of the leaves of the same species, according to the degree of elevation upon the mountainous declivities, to the severity or mildness of the climate, the greater or less humidity of the soil, and to various circumstances in the growth of individual plants. Even the same tree often produces foliage of a diversified character; and a person not aware of this fact, might be led to imagine that he had discovered different species from an examination of the leaves which have grown upon one and the same branch. The fructification partakes to a certain extent of the same varying character with the foliage; and the difficulty is thus still further augmented.

Lambert, in his "Illustrations of the Genus *Cinchona*," after admitting with Humboldt the identity of several varieties which had received specific names from other botanists, describes nineteen species exclusive of the two Peruvian *Buenæ*. De Candolle enumerates only sixteen well ascertained species, but admits the probable existence of several others not yet published.

In the present state of our knowledge, it is impossible to decide from which species of *Cinchona* the several varieties of bark are respectively derived. The former references of the yellow bark to the *C. cordifolia*, of the pale to the *C. lancifolia*, and of the red to the *C. oblongifolia*, have been very properly abandoned in the last edition of the United States

Pharmacopœia, though still retained in those of the London and Edinburgh Colleges. It will be shown hereafter, that the valuable barks, which are now known in the market by these titles, are at least in two of these instances, not the product of the species to which they have been ascribed. It is stated by Humboldt, that the property of curing agues belongs to the barks of all the Cinchonæ with hairy and woolly blossoms, and to these alone. In Lambert's catalogue, this division includes seventeen species. The most prominent of these will be particularly noticed in this paper, the others merely mentioned.

1. *C. lancifolia*.—Not a little difference of opinion has existed on the subject of this species of Cinchona. The name was applied by Mutis to a tree, first noticed by himself, which flourishes in the neighbourhood of Santa Fe de Bogota, and the bark of which is known at that place by the title of *cascarilla naranjanda*, or orange coloured bark. From specimens which he received of the Cinchona originally observed by La Condamine, from which the celebrated *cascarilla fina de Uritusinga* was derived, he was induced to consider this tree as identical with the *C. lancifolia*. But Loxa, in the vicinity of which this fine bark is collected, is separated from Bogota, the residence of Mutis, and the locality of his *C. lancifolia*, by no less than eight degrees of latitude, and was never visited by this botanist, so that he had no opportunity of personally inspecting the plant in its natural state. While Mutis, five hundred miles to the north of Loxa, was thus identifying the *cascarilla fina de Uritusinga* with his own *cascarilla naranjanda*, Ruiz was claiming for his *C. nitida*, which grows at an almost equal distance to the south of that place, the honour of being the plant seen and described by La Condamine. But Ruiz also laboured under the disadvantage of never having visited Loxa, and like Mutis was compelled to form his opinions upon uncertain grounds. Humboldt and Bonpland, who were themselves in that neighbourhood, and had the opportunity of personally inspecting the tree in its native forests, assert

that it is neither the *lancifolia* of Mutis, nor the *nitida* of Ruiz and Pavon—plants which have since been satisfactorily ascertained to be identical—but a distinct species never before accurately described, which they name in honour of its first observer, *C. Condaminea*. Lambert, however, gives his opinion in favour of Mutis, stating that the *scrobiculi* on the leaves, which Bonpland regards as a permanent differential character, are found more or less numerous in all the species of the genus. Much weight is due to the opinion of this botanist, as he had specimens of both plants before him. A. T. Thomson in his dispensatory states that the *C. Condaminea*, if not precisely the same with the *C. lancifolia*, is evidently a variety of that species; and M. Guibourt, in a report recently presented to the Society of Pharmacy at Paris, coincides with Lambert. If this opinion can be relied on, the *C. lancifolia* would appear to be very widely spread over the mountainous regions of New Granada and Peru; for Bogota, where it was found by Mutis, is between 4° and 5° of north latitude; while the forests of Huamiles and Xauxa, where the *C. nitida* of Ruiz and Pavon, now acknowledged to be identical with it, was observed, are from 10° to 12° south of the equator; and the *C. Condaminea* occupies an intervening station between these two extremes. To this species are also reduced by the best authors the *C. glabra* and *C. angustifolia* of the Quinologia of Ruiz, and the *C. lanceolata* of the Flora Peruviana; and the process of condensation has been carried still further by professor Zea. But giving its due weight to the authority of Mutis, supported by the botanists who have been mentioned, it is impossible not to hesitate, unless with ampler means of forming a correct opinion than we are at present possessed of, in pronouncing Humboldt and Bonpland to have been mistaken; for these celebrated travellers, from their abundant opportunities of personal inspection, from their access to all the knowledge of their predecessors, and from their high scientific qualifications and habits of observation, are indisputably the first authority at present existing, on the subject of the natural history of the Cinchona.

In the remarks, therefore, which follow, the *C. Condaminea* of Humboldt and Bonpland, and the *C. lancifolia* of Mutis, will be considered separately, without the pronunciation of any decided opinion as to the identity of their botanical characters. It is proper, in the present place, to observe, that the causes which tend to perplex botanists in arranging the different species of the genus *Cinchona*, are particularly applicable in the individual case before us; as, in the language of Humboldt, "the *C. Condaminea* varies amazingly in its leaves."

The *C. Condaminea* grows under the fourth degree of south latitude, on the declivities of the mountains, at an elevation of from about one mile to a mile and a half, and in a mean temperature of 67° of Fahrenheit. It is confined to the neighbourhood of Loxa, where it grows near the village of Ayavaca, and in the vale of Rio Calvas. When full grown its stem is about eighteen feet high and a foot in thickness, with branches arranged in opposite pairs, of which the lower are horizontal, the higher rise upwards at the extremities. The leaves are shining, of a lively green colour, generally, when full grown, about four inches long and less than half as broad, and furnished with glands or small convex prominences upon their upper surface, with corresponding scrobiculi or depressions upon the under. In very young plants they are much broader in proportion to their length; and it is an observation of Humboldt, that the older the tree, the narrower is the leaf. The bark of the trunk is of an ash-gray colour, with clefts or fissures, and yields on incision a bitter, astringent juice; that of the small branches has a grayish hue, is smooth and glossy, and easily separable from the wood. It is this plant which yields the *cascarilla fina* of Loxa, the original Peruvian bark, which was valued so highly in Spain as to be the subject of royal monopoly, and was received in other parts of the world only through the channels of illegitimate commerce. The name of *crown bark* of Loxa, by which it is very generally known, evidently originated in this circumstance.

The *C. lancifolia*, or that variety of the species which was discovered by Mutis in New Granada, is a very handsome tree, from thirty to forty-five feet in height, with a trunk from one to four feet in diameter. It is quite solitary, never clustering like other Cinchonæ of the same neighbourhood, which are often so crowded together as to form almost closely connected shrubberies. This solitary character appears to pertain to all the more valuable species, and has led to their scarcity in the regions where bark has been long collected. When a tree has been felled, no suckers, as in the inferior species, arise from the roots, and assist to propagate the plant. Perhaps the superiority in size of the full grown *C. lancifolia* of Mutis over the *C. Condaminea*, as described by Humboldt, is attributable to the fact, that the bark has been gathered in Loxa from the earliest periods of its use as a medicine, while in New Granada the commerce in the drug is comparatively of recent date. The *C. lancifolia* requires a colder climate than the *C. Condaminea*, growing between the fourth and fifth degrees of north latitude, at an elevation upon the mountains of from four thousand five hundred to near ten thousand feet, and in a mean temperature of 61° of Fahrenheit. In the highest situations in which it is found the thermometer often sinks to 50°, and in the nights is sometimes at the freezing point. Judging from the botanical characters of this species as given by Mutis, it scarcely differs from the *Condaminea*, unless we consider the absence of glands upon the leaves as sufficiently distinctive. That it yields the same kind of bark is to be inferred from the fact, that the *cascarilla fina de Uritusinga* or crown bark of Loxa, admitted to be the product of the *Condaminea*, was considered by the experienced Mutis as identical with the *cascarilla naranjanda* derived from his *C. lancifolia*; while Ruiz and Pavon, without any communication with Mutis, and at the distance of nearly a thousand miles, claimed a similar identity for the bark of their *C. nitida*, now acknowledged to be the same tree with the *C. lancifolia*. The crown bark of Loxa is universally ranked among the pale barks, while that

of the *C. lancifolia* growing near Bogota is called "orange coloured;" and this difference of title might appear to indicate a difference in their nature; but the difficulty vanishes when we consider that the latter name was derived from the colour of the internal surface of the bark, the former from that of the powder, and that the pale barks are orange coloured in their natural state. It is probable that much if not most of the pale bark of commerce is derived from varieties of the *C. lancifolia*.

2. *C. cordifolia*.—This plant was originally described by Mutis, who found it in the mountains about Bogota; and it is said to flourish also in those of Loxa and Cuenca in the ancient kingdom of Quito. Like the other medicinal species it grows on the elevated plains, and on the declivities of the Andes, at heights varying from five thousand eight hundred to nine thousand five hundred feet. It is a spreading tree, fifteen or twenty feet high, rising on a single, erect, round stem, which is covered with a smooth bark of a brownish gray colour. The smaller branches have a lighter coloured bark, and are covered with a fine down. The leaves vary much in form, but some of a heart shape are to be found on almost every branch, and have given origin to the name of the species. They are usually about nine inches long, smooth and shining on the upper surface, ribbed and pubescent on the under. The down upon the leaves and smaller branches has given rise to the name of *velvet bark*, by which the tree is known to the common people of New Granada.

In the British Pharmacopœias the *C. cordifolia* is recognized as the source of the officinal yellow bark. It undoubtedly produces the variety known to the Spaniards as the *quina amarilla* or *yellow bark of Santa Fe*: but this is by no means the article which circulates in the commerce of this country, England and France, by the name of *yellow* or *Calisaya bark*, and which is so largely consumed in the manufacture of Sulphate of Quinia. This will at once be rendered obvious by the statement, that the valuable yel-

low or Calisaya bark is derived exclusively from the western coast of South America on the Pacific; while the *C. cordifolia* of Mutis flourishes most about Bogota, of which the commercial outlet is Carthagena on the northern coast of the continent. The fact seems to be that this species yields the yellow Carthagena bark, which is probably identical with the *Quinia Amarilla de Santa Fe* of the Spaniards; and the British Colleges have simply followed Mutis in ascribing the yellow bark to the *C. cordifolia*, without taking into consideration the total want of similarity, except in the colour, between the medicine known to him by that title, and the valuable variety which they intended to adopt as official. The yellow bark described by Thomson in the London Dispensatory as derived from the *C. cordifolia* is in all respects identical with the *Calisaya*, and totally different from the yellow Carthagena bark, which is probably the real product of this species. In the late edition of the United States Pharmacopœia this error of the British Colleges has been corrected.

By some authors, the *C. pubescens* of Vahl and the *C. hirsuta* of the Flora Peruviana are considered mere synomyms of the *C. cordifolia*: but others pronounce them to be distinct; and the latter opinion is supported by the fact, that though these trees grow in Quito and Peru, no bark is brought from the Pacific identical with the yellow bark of Carthagena, which it can hardly be doubted is the product of the *C. cordifolia*.

3. *C. pubescens*.—This was described and named by Vahl, who received his specimens from the collection of Jussieu at Paris, whither it was brought by Joseph de Jussieu from the neighbourhood of Loxa. It is admitted to be identical with the *C. ovata* of the Peruvian Flora even by the authors of that work. Bonpland has pronounced it to be the same with the *C. cordifolia*; but Lambert, though he admits their similarity, decides from dried specimens in his possession that they are quite distinct, and states the characters in which they differ. The *C. pubescens* grows about

Loxa, also in the warmer regions of the Andes near Pozuzo and Panao, and in the forests of Huanuco to the north west of Lima. It resembles the *C. cordifolia* in the pubescent character of its leaf, from which its name was derived. It contributes to furnish the bark of commerce, though it is impossible to ascertain with certainty the particular variety which it affords. Ruiz calls its product *cascarilla palido*; and it is not improbable that a portion of the pale bark of Loxa and Lima is derived from it.

4. *C. Hirsuta*.—Humboldt, upon the authority of Zea, erroneously referred this species to the *C. cordifolia*, and the error has been copied by De Candolle. The two species have not the least resemblance; and Zea himself has acknowledged his mistake*. The *C. Hirsuta* derives its name from the hairs on its leaves and flowers. It grows in lofty and cold situations on the Peruvian Andes, near Pillao, and Acomayo. It attains the height of about fifteen feet, and is then surrounded by shoots springing upwards from its roots, and forming with the parent tree, an oval surface, having the appearance of a dome. Its bark is called *delgada* or slender, is very thin, and may be ranked among the pale varieties of English and American pharmacy, the gray of the French. Though a valuable bark, it is seldom gathered, as its extreme fineness renders its collection much less profitable than that of the larger varieties.

5. The *C. purpurea* of the Flora Peruviana, which Lambert identifies with the *C. Scrobiculata* of Humboldt and Bonpland, grows in the mountains of Panatahuas and Huanuco. The tree examined by Humboldt flourishes near the city of Jaén de Bracamoros, where it forms immense forests. It is a large tree, attaining the height of forty feet, with leaves from four to twelve inches in length, and from two to six in breadth. Humboldt and Bonpland tell us that the bark of its younger branches so much resembles that of the

* Lambert's illustrations, A.D. 1821.

C. Condaminea, that it is difficult to distinguish the two varieties. It cannot, therefore, as stated by De Candolle, be one of the red barks of commerce; for the product of the *C. Condaminea* is universally classed among the pale or gray barks. It is called by the natives *cascarilla fina*, and probably contributes to form the packages which come to us under the name of Loxa bark. The *C. purpurea* yields a bark denominated *cascarilla morada*, or mulberry bark. It is brought into the market, mixed with the other pale barks from the same neighbourhood, and as Lima is the entrepot for the produce of the country about Huanuco, it probably takes the name of that city. The pale barks of Lima, however, are all confounded in this country with those of Loxa, which shows the folly of attempting to designate the particular varieties from the places where they grow.

6. *Cinchona oblongifolia*.—This tree was discovered by Mutis in New Granada, where it is very abundant, especially in the vicinity of Mariquita, in about four degrees of north latitude. It grows at an elevation of from four thousand to eight thousand five hundred feet, and is one of the largest trees of the genus, rising to a great height, on a single, erect, round stem, which is covered with a smooth, brownish ash-coloured bark. The leaves which are opposite have an oblong oval shape, and attain a great size, being frequently one or two feet in length. Botanists generally agree with Humboldt and Bonpland in uniting with this species the *C. Magnifolia* of the Flora Peruviana, which grows to the south of the equator upon the mountains of the Panatahuas, near Cuchero, Chinchao, and Chacahuassi, where it was seen by Ruiz and Pavon in the year 1780. Lambert, however, describes them as distinct species.

The *C. oblongifolia* is called by the natives *cascarilla de flor de azahar*, from the resemblance of its flowers in odour to those of the orange. Till very recently it has been considered as indisputably the source of the best red bark of commerce, which is ascribed to it by the British Pharmacopœias. A little reflection might have convinced those ac-

quainted with the commerce in bark, that this reference was incorrect; for who ever hears of the officinal red bark as coming from Carthagena; and yet this is the port from which the product of the *C. oblongifolia* growing in New Granada is shipped. The mistake originated in that implicit acquiescence with which the statements of Mutis have been received. The tree does, undoubtedly, as asserted by Mutis, produce a red bark; but it is the red *Carthagena* bark, a comparatively valueless variety, wholly distinct from the genuine red bark, brought from the Pacific, and so highly esteemed as a febrifuge. There will be occasion hereafter to say more on this subject.

7. *Cinchona micrantha*.—This is a large and handsome tree, which was seen for the first time by Tafalla in the year 1797, in the cold and elevated regions of San Antonio Playa Grande, in the Peruvian Andes. Its bark is called in the country *cascarilla fina*, a name which indicates the value attached to it by the natives: but we are in possession of no information by which it might be identified among other varieties.

8. The *C. macrocarpa* of Vahl, identical with the *C. ovalifolia* of Mutis, inhabits the provinces of Loxa and Cuenca, where it forms considerable forests. It was also found by Mutis in New Granada, and grows as far north as Santa Martha. It derived its name from the extraordinary magnitude of its fruit. Its bark is called by the Spaniards *Quina Blanca* or white bark, probably from the colour of the epidermis. May not this species be the source of that commercial variety brought from Maracaybo and Santa Martha, in the neighbourhood of which the tree is said by Humboldt to be found?

9. The *C. glandulifera* of the Flora Peruviana is a shrub about twelve feet high, having usually three or four stems united together, each about three inches in diameter. It was found by Ruiz and Pavon in the forests of Chicoplaya, and on the banks of the Taso, to the north of Huanuco, where the temperature is moderate. Its bark is among those which

the French call *gray*, and is more particularly designated by the name of the Peruvian city near which it grows; although, as in the case of the *Loxa* barks, those of Huanuco are by no means confined to a single species.

Besides the species already enumerated, several others probably furnish more or less of the bark of commerce. Among these may be mentioned; 10. *C. ovalifolia* of Humboldt and Bonpland, a shrub from six to nine feet high, inhabiting the province of Cuenca, where it forms considerable forests, and is called by the natives *cascarilla peluda* or hairy bark; 11. *C. caduciflora* of Humboldt and Bonpland, a very large tree, more than one hundred feet high, growing near the city of Jaén de Bracomoros, and yielding a bark called *cascarilla bova* by the Peruvians; 12. *C. acutifolia* of the Flora Peruviana, a tree twenty-four feet high, discovered by Tafalla in the Peruvian mountains north of Huanuco, near the Taso, and yielding the *cascarilla hoja aguda*; and 13. *C. dichotoma*, which grows to the height of fifteen feet, was discovered by the same botanist in the same region as the preceding species, and affords the bark called *cascarilla aharquilla* by the natives.

Besides these species, several others might be added which, though named and described by botanists, are not known to furnish any of the bark of commerce. Such are the *C. Macrocalyx*, *C. Pelalba*, and *C. Crassifolia* of Pavon, quoted by De Candolle; and the *C. Pavonii*, *C. Humboldtiana*, *C. Rotundifolia*, and *C. Stenocarpa*, described by Lambert upon the authority of Pavon, and from specimens in his own possession.

In all the preceding species the corolla is more or less hairy or woolly. The *C. Rosea* is the only one strictly belonging to this genus which has the corolla entirely smooth. It rises usually to the height of fifteen feet, and when in blossom presents a very handsome appearance, as well from the

richness of its foliage, as from the beauty of its flowers, with which the natives adorn their churches. It inhabits the forests of the Andes near Pozuzo, and San Antonio de Playa Grande. Its bark is called *cascarilla pardo*.

[To be continued.]

SELECTED ARTICLES.

ART. V.—*On the Balsam of Copaiba; extracted from a Report made to the Société de Pharmacie. By MM. Lecanu, Blondeau and Guibourt.*

The gentlemen above named were appointed to examine a paper presented to the Society of Pharmacy, by M. Fauré, Pharmacien, on the solidification of Turpentine and the Balsam of Copaiba, by means of calcined magnesia. M. F. has treated different parcels of turpentine with calcined magnesia, and the several mixtures became solid more or less promptly, according to the quantity of magnesia employed. He therefore proposed to prepare pills of turpentine with fourteen gros of thin, transparent turpentine, and half a gros of magnesia calcined; and he stated, that at the end of twelve hours the mass would assume the pilular consistence, and in four or five days become friable. He thought that advantage might be taken of this property of turpentine to incorporate with it a larger proportion of volatile oil than it naturally contains, in order to facilitate its application in neuralgic affections, for which it has lately been recommended. Consequently he has proposed the following formula.

Turpentine, thin and transparent,	6 gros.
Volatile Oil of Turpentine,	2 gros.
Calcined Magnesia,	$\frac{1}{2}$ gros.*

* One gros is equal to 59.1 troy grains.

M. F. has also observed, that the Balsam of Copaiba of commerce varies in colour, odour and consistence, according to the length of time it has been suffered to drain after collection, and to the kind of vessels in which it has been preserved. This deficiency of consistence, according to him, renders it necessary to augment the proportion of calcined magnesia, or at least to expose the balsam to the open air for a few days, in order to evaporate a portion of the essential oil which renders it too fluid.

The consistence may also be augmented by the addition of a little turpentine, and then it will solidify though castor oil should be present.

Balsam Copaiba, that will not solidify with one-sixteenth of magnesia, will assume a pilular consistence by the previous addition of one-sixth of turpentine in six or eight days. And that, which is susceptible of solidification with one-sixteenth of magnesia, may be deprived of this property by the previous admixture of one-twentieth of castor oil: but, if before the magnesia be added to such adulterated balsam one-fifth of turpentine be combined with it, the solidification will still take place, notwithstanding the presence of the castor oil.

So far, then, according to this statement, is the magnesia from being a test of the purity of Copaiba, that it is liable to lead the pharmacien into error, who should rely on it as a certain means of detecting the sophistication of this article.

These are the principal facts contained in the note of M. F., and the committee to whom it was referred were surprised at the statement as one of them had some time before arrived at almost entirely opposite conclusions.

This committee state, that four specimens of Balsam of Copaiba of commerce were procured.

No. 1 was transparent, of a deep yellow and of a tolerably thick consistence. Tested with ammonia in the proportion of three drops of balsam to one of the alkali, its transparency was completely impaired, which fact was then con-

sidered as a proof that it was adulterated with some fixed oil. No. 2 was perfectly transparent, very liquid, and of a pale yellow. No. 3 was opaque, (troublé), and No. 4 was transparent, but it became opaque afterwards, and deposited a portion of water.

The three latter, tried with ammonia, became perfectly transparent after some minutes of agitation, which induced the belief that they were of better quality than No. 1 ; but being mixed with one-sixteenth of calcined magnesia, No. 1 only, promptly hardened and assumed a pilular consistence. No. 4 was much thickened without becoming hard enough to form pills ; and Nos 2 and 3 were not augmented in consistence.

Desirous of ascertaining the cause of this difference in the results, and possessing two methods, equally recognized for testing the purity of Balsam of Copaiba, 2 gros of each number were treated with 12 gros of alcohol of 36°. All of them left an oleiform residue, but those of Nos 1 and 4 were sufficiently thick and coloured, while those of Nos 2 and 3 were white and liquid.

The floating liquid was decanted and replaced by an ounce of new alcohol : then No. 1 left only a very small residue, but formed a resinous, solid, transparent coating on the bottom of the bottle. This residue is a resin, insoluble in alcohol, and approaching those of anime and copal. No. 4 left a similar residue, but somewhat unctuous ; as to Nos 2 and 3, the residue was oily and liquid and acquired by boiling in water or exposure to the air a strong rancid odour. Thus, these two balsams, which, tested by ammonia, appeared to be superior, contained, nevertheless, a fixed foreign oil ; and as they are the same which acquired no consistence by the addition of calcined magnesia, it becomes apparent that this alkaline base still offers the best means of testing the purity of Balsam of Co-paiba. First conclusion opposed to M. F.

The experiment was then tried on copaiba, No. 2, to ascertain if by evaporation of its volatile oil, or by its transfor-

mation into a resin, it would acquire the property of hardening with magnesia.

One ounce was very carefully weighed in an uncovered capsule; then covered with a simple paper, and weighed from time to time. A singular fact, but nevertheless easy to explain, occurred at the first weighing, which was that the capsule was slightly augmented in weight at the end of two days.

Afterwards it gradually diminished in weight, without however exceeding a loss of two or three grains. At the end of five days the balsam had become very thick, and was mixed with one sixteenth of calcined magnesia without acquiring any greater consistence.

This fact is also contrary to that ascribed by M. F.

Finally, no advantage was acquired by adding to the balsam Nos 2 and 3, a quantity of fine turpentine, as it did not sensibly augment the property of hardening with magnesia.

All of these experiments were made long anterior to the communication of M. F., nevertheless the following were tried to test the truth of one or the other. Fourteen gros of fine turpentine were mixed with half a gros of calcined magnesia, and according to the statement of the author of the note, it ought to acquire the pilular consistence in twelve hours, and become friable in four or five days; but at the end of three days, it had only assumed the consistency of very thick turpentine.

Another mixture of one ounce of turpentine with half a gros of calcined magnesia (the proportions indicated by M. Mialhe), became firmer, but not sufficiently so to form pills.

A more conclusive experiment was tried by mixing four gros of copaiba with eighteen grains of magnesia, and in forty-eight hours the whole had become of a good pilular consistence.

When forty-eight grains of turpentine were mixed with the four gros of copaiba, and eighteen grains of magnesia added to them, the mass was less consistent at the end of eight days than the preceding.

Thus, contrary to the assertion of M. F., turpentine cannot be employed to falsify the Balsam of Copaiba, and the calcined magnesia may be considered as still an excellent test for the purity of this article. The reporters do not believe that it is possible to incorporate in turpentine pills made with magnesia, a notable quantity of volatile oil; but they think, that by employing one gros of magnesia for one ounce of the turpentine, the mass may be formed into pills very superior to those made in the ordinary way, either by using turpentine that has been dried, or reduced to a proper thickness by the admixture of a large quantity of powder.

The state of the magnesia in the turpentine, and the solidified Balsam of Copaiba, forms another very interesting subject for investigation.

According to M. F., when a mixture of magnesia and turpentine is treated with alcohol, the whole of this base is left with all its alkaline properties; which has induced the belief that it acts as an absorbent, and exists in the state of simple mixture, and not as a chemical combination.

Notwithstanding, however, that the influence exercised by the magnesia on the turpentine be much more feeble than that which this earth exerts over copaiba, still it is difficult to conceive that there is not a chemical union between a part of the magnesia and the resin of turpentine.

M. F. stated that if solidified copaiba be treated by boiling alcohol, a portion is dissolved, leaving the magnesia with which it was combined. But the resinous part remained undissolved in any quantity of alcohol that might be employed; while it was readily soluble in sulphuric ether, leaving a less quantity of magnesia than was left from the alcoholic solution. It is therefore to be inferred that the magnesia was not all separated by these experiments, and the committee have always thought that the magnesia solidified and saponified the resin, and that it was this compound which dissolved the volatile oil, and gave to the mass a medium consistence between the fluidity of the latter and the hardness of the saponified resin.

Our experiments, they observe, do not prove that the magnesia exerts no action on the volatile oil; but they induce us to think that this base acts equally on the two constituent parts of copaiba; and that which they do prove without contradiction, is, that the magnesia exists in a state of combination, and not as a mere absorbent.

By treating with sulphuric ether two gros of copaiba that had been solidified for a month with one sixteenth of calcined magnesia, there remained at first a considerable flocculent deposit, which in part disappeared by subsequent treatment with ether. There finally was left a hard, white, tenacious, insoluble residue, which became dry and pulverulent by desiccation. This was not pure magnesia as M. F. believed, but a combination of magnesia and resinous matter; and it is very probable that this resinous matter is that which is insoluble in alcohol, and which exists only in small quantities in the copaiba, but which composes almost entirely the resins of anime and copal.

The ethereal solution, filtered, and allowed to evaporate spontaneously, left a substance having the transparency and colour of copaiba, but much thicker. Calcined in a crucible it left a considerable quantity of magnesia; thus proving there existed a combination of this base with the resin and perhaps with the oil of copaiba, and this combination is soluble in ether.—*Journal de Pharmacié*, Sept. 1830.

At a sitting of la Société de Pharmacié of Paris on the 10th of November 1830, a letter was received from M. Fauré of Bordeaux, containing some observations on the report which was made to the society on his memoir, relative to the solidification of Balsam of Copaiba by magnesia. He believes that the cause of the difference, between his results and those obtained by the reporters, will be found to exist in the nature of the turpentine on which they severally operated. M. Fauré sent a specimen of turpentine which he had employed in his experiments, and requested that the committee would repeat theirs with that article. He believes equally that the contradictory results obtained by himself

and the committee with the Balsam of Copaiba are to be attributed to the difference in the purity of this drug.—*Journal de Pharmacie*, Nov. 1830.

ART. VI.—*On the Bitter of Aloes employed in colouring.*

According to professor Liebig, when eight parts of nitric acid are distilled with one part of aloes, and water is added to the remaining liquid, a resinous substance of a yellow red colour is deposited, which, by washing, becomes pulverulent.

A larger quantity is procured by using weak nitric acid, and this is the substance known by the name of "*Bitter of Aloes.*" When the yellow liquid in which this substance is formed is evaporated to a certain point, large yellow, opaque, rhomboidal crystals are formed, which are a combination of oxalic acid, and the Bitter of Aloes. After five or six crystallizations, this latter separates from the oxalic acid, and combined with salifiable bases, it affords detonating salts. It owes this property to the cyanic acid which it contains, united with a particular substance analogous to that which has been named resin of indigo. The Bitter of Aloes dissolves in from eight hundred to one thousand times of cold, but it is more soluble in hot water, and its solution is of a beautiful purple. When silk is boiled in it, it becomes of a purple colour that resists the action of all the acids, except the nitric, which changes it to a yellow ; but by washing it in cold water the purple colour will be restored.

ART. VII.—*Memoir on the Quantity of Extract furnished by different species of Sarsaparilla. By M. Thubeuf, Pharmacien at Paris.*

It has long been the practice with many physicians to give their preference to certain kinds of sarsaparilla, and for others, on the contrary, to withhold their confidence from all of them. In consequence of these discordant opinions, and for want of sufficient proofs, some, less exclusive in their opinions, have directed them indiscriminately, or at least appeared by their silence, to attribute to every variety properties equally medicinal.

The nature of the medicinal principle of the sarsaparillas not having yet been demonstrated by chemical analysis, each conceives his own opinion to be founded in reason, and it is also more than probable that inferior qualities are thrown into market.

It is generally admitted at the present day, that Sarsaparilla does not abandon all its active properties to water, even boiling, and that the employment of alcohol of 22° is absolutely indispensable to deprive it of all its efficient material. The experiments I have performed lately, have confirmed the opinion I entertained of this excellent process, and it appeared to me that a work which would establish correctly the quantity of extract furnished by each species of sarsaparilla, according to the mode indicated, would enable us for the present to estimate with tolerable correctness, the qualities of these roots; I have therefore undertaken it with all the perseverance and care, required by such an important operation.

The following is the process which I have employed, each sarsaparilla being without stems, and well cleansed.

After cutting the sarsaparilla it was macerated for forty-eight hours in a sufficient quantity of water, when it was taken out and submitted to a press. It was then bruised with a pestle, in order to immerse it for four days in a suf-

ficient quantity of alcohol of 22°. The aqueous infusion after being strained, was evaporated to the consistence of an extract by a vapour bath, and the first alcoholic maceration being finished, the Sarsaparilla was pressed, the liquor suffered to settle, filtered and distilled. The hot product remaining on the water bath, was filtered and reduced to the form of an extract; and the sarsaparilla thus treated, was taken up a second and a third time by alcohol of 22°, in which it was macerated, and each maceration submitted to a water bath of about 60° cent. for twelve hours. When arrived at this point it was suffered to cool, and was expressed; and finally the sarsaparilla was put into a sufficient quantity of cold water for forty-eight hours.

The alcoholic liquors of the second and third macerations after the aqueous infusions were submitted to the same operations as that of the first maceration in alcohol, and converted into extracts.

The second aqueous maceration was subjected to the press, strained, and reduced by evaporation to the form of an extract.

THE RESULTS.

Red Sarsaparilla of Jamaica.—Six pounds of this sarsaparilla produced,

1st operation, Maceration in water	3vj 3ij	3xxi. 3ij.
2d 1st maceration in alcohol at 22°	3vij 3v	
3d 2d maceration in alcohol at 22°, followed by an infusion of 12 hours at about 60° cent.	3ijj 3j	
4th 3d maceration in alcohol at 22°, followed also by an infusion of 12 hours at about 60° cent.	3j 3ij	
5th 2d maceration in water	3ijj	

Honduras Sarsaparilla.—Six pounds of this sarsaparilla produced,

1st operation	3ijj	3iv	} xiv
2nd	3iv	3vj	
3d	3ij	3vij	
4th	3j	3iij	
5th	3j	3iv	

Sarsaparilla of Portugal.—Six pounds of this sarsaparilla produced,

1st operation	3v	3iv	} 3xijj. 3iss.
2nd	3ijj	3ivss	
3d	3j	3vss	
4th	3j	3ijss	
5th	3j	3j	

After having thus ascertained the quantity of extract furnished by each species of sarsaparilla, I became curious to know what product could be obtained from the stems or stalks, deprived carefully of all those portions of the root which are usually attached to them. The following results surprising only by the quantity of bad product will serve, if that were necessary, to induce us to reject, as entirely useless, this part of the plant.

Stems of the Sarsaparilla.—Six pounds of the stems, cut fine and bruised, were submitted to the same processes as the sarsaparilla, and yielded the following products,

1st operation	3v	3ij	} 3ix. 3iijss.
2nd	3j	3ivss	
3d	3j	3ij	
4th		3vj	
5th		3v	

All the macerations of the stems, with the exception of the first, which was of a deep black, were of a peculiar yellowish colour. The liquor remaining in the water bath after the distillation had the appearance of water in which rhubarb had been boiled, and they deposited a considerable quantity of seculent matter. The extract was without

a well pronounced bitterness, and had, besides, a very disagreeable taste; it was almost totally destitute of that belonging to the extract procured from good sarsaparillas.

From the observations made during this investigation, I feel confident in recommending the above process for the preparation of the extract of sarsaparilla; which may be modified by suppressing the fourth and fifth operations. It would also be well, to prolong to four days each the first and second alcoholic macerations. I am persuaded that the compounds made with such an extract would be found to possess all the properties inherent in the sarsaparillas. They would be more active in proportion as the extracts were more concentrated, either by the vapour or the water-bath, for it cannot be doubted that these preparations are sensibly altered by the naked fire, not by the volatilization of some principle, as Galileo Palotta thought, but as M. Souberrain observed by the direct action of caloric.

I may remark here, that the aromatic principle of the sarsaparillas resides in a greasy fixed matter, which I have insulated, and which, as is the case with all those found in sarsaparilla, is united with a large quantity of acid. Not having been able to procure at the time the other species of sarsaparilla that I wished to submit to the same treatment, the prosecution of the examination is postponed to a future period.—*Journal de Pharmacie*, Nov. 1830.

ART. VIII.—*On the Adulteration of the Hydriodate of Potash. By J. Pereira, Esq. F.L.S. Lecturer on Chemistry, Materia Medica, &c.*

Having in two instances lately met with Hydriodate of Potash much adulterated with the carbonate of potash, and

believing that this adulteration is very common, although it has not hitherto been noticed, I have taken the liberty of drawing the attention of the profession to this subject, through the medium of the London Medical and Physical Journal, and of pointing out the easiest methods of detecting it.

It is well known that iodine is very sparingly soluble in water; but that water holding in solution Hydriodate of Potash is capable of dissolving a larger quantity of iodine. In the general dispensary a solution termed liquor iodina is kept, made on this principle; that is consisting of iodine dissolved in a solution of the hydriodate. My attention was first directed to the adulteration of this salt by one of my assistants, who informed me that he had twice failed in making the liquor. Thinking that he might have committed some error, I attempted to make it myself, but found that the iodine was only partially dissolved. Of course, I immediately inferred that either the iodine or the hydriodate was impure. The iodine, however, I soon found was quite pure, and I then directed my attention to the hydriodate. This salt was observed to contain but very few crystals, those that were noticed, however, had the appearance of the hydriodate.

The greater part of the salt seemed as if it had been heated so as to destroy its crystalline form. To the taste it was powerfully alkaline, and affected very strongly vegetable colours. These characters led me to suspect that it contained an alkaline carbonate.

Muriatic acid added to a solution of it produced effervescence; the same takes place with the pure hydriodate, owing to the separation and decomposition of the hydriodic acid; but in the case of the suspected salt, however, the gas that escaped was conducted by means of a curved tube into lime water, which it immediately rendered milky, proving that carbonic acid was present. A solution of the suspected salt added to lime water, gave a white precipitate, soluble with effervescence in muriatic acid. The same coloured precipitate took place when the suspected solution was added to a solution of muriate of barytes, and effervescence

was produced by the addition of muriatic acid. Sugar of lead gave a white precipitate of carbonate of lead, instead of a beautiful yellow one of iodide of lead, which the true hydriodate gives. Hence, it was clear that an alkaline carbonate was present; but was it potash or soda? To determine this I proceeded as follows.

It is well known that the salts of potash impart to flame a beautiful pale violet colour; but those of soda a pure yellow. Hence, if a salt of soda be mixed with a salt of potash, its presence may be detected by the alteration in the colour of the flame. On this principle, I determined that the substance used to adulterate the hydriodate was carbonate of potash. A piece of clean pack-thread was wetted with a strong solution of the suspected salt. The wetted end was then dipped into the cup of tallow immediately surrounding the wick of a candle, so that it might be enveloped in melted tallow. It was then applied to the exterior of the flame, not quite in contact with the luminous part, but so as to be immersed in the cone of invisible but intensely heated air which envelopes it. An irregular sputtering combustion of the tallow on the thread took place, and the invisible cone of heat was rendered luminous, of a *pale violet colour*. Hence, then, it did not appear, that any salt of soda was present; otherwise the colour of the flame would have been rendered more or less yellow.

Having thus satisfied myself that the impurity was carbonate of potash, I next proceeded to ascertain the quantity of it. Some of the salt was heated in a glass tube over a spirit lamp to deprive it of water. Ten grains of the salt thus dried were dissolved in distilled water, and excess of muriate of barytes added. A precipitate consisting of carbonate of barytes took place, which was collected and dried by a water bath; it weighed eleven grains. Now eleven grains of carbonate of barytes consist of

Carbonic acid	2.42
Barytes	8.58

Hence, then, there must have been 2.42 grains of carbonic acid in 10 grains of the suspected salt. Assuming from the

strong alkaline taste of the salt, its powerful effect in turning green, vegetable blues, and from its precipitating sulphate of magnesia, that the carbonic acid was combined with potash, in the proportion to form the carbonate, (sub-carbonate of the pharmacopœia,) it must therefore have been combined with 5.28 grains of potash.

Consequently the adulterated salt consisted of

Iodide of Potassium,*	2.30
Carbonate of Potash (sub-carbonate P. L.),	7.70
	10.00

The quantity of iodide of potassium is here inferred from the quantity of the carbonate of potash present. That this inference is correct, there can be, I think, but little doubt; certainly the quantity of iodide cannot have been larger than is here stated. Now assuming that the equivalent for iodine is 125, it follows that 2.30 grains of iodide of potassium contain about 1.66 of iodine. In the following experiment I obtained 1.5 of iodine, which is a very close approximation, particularly when we consider the very volatile nature of this substance.

Ten grains of the suspected salt perfectly dried were introduced into a glass tube, and strong nitric acid added to it by means of a dropping tube. Effervescence took place, and the iodine vapour which was evolved condensed on the sides of the tube.

The iodine was then cautiously sublimed into another tube inverted near the first one. To guard against moisture, the second tube which contained the iodine was placed under an exhausted air pump receiver, with sulphuric acid for a few minutes. The iodine weighed 1.5 grain: hence, we have a right to conclude, that the above mentioned quantity of iodide of potassium is correct. If, as I suspect, the adulteration of Hydriodate of Potash be frequently practised, it will explain why such different statements of the effects of

* When *Hydriodate of Potash* is heated to drive off its water, it is converted into *iodide of potassium*; but by solution in water the latter is converted into the *Hydriodate of Potash*.

this remedy have been made ; when pure it is a most valuable remedy in glandular and other affections. But it must be evident to every one, that very different effects result from the use of sub-carbonate of potash instead of the hydriodate.

I shall now make a few remarks on the best methods of detecting adulterations of this salt. The substances most likely to be met with are the carbonates, sulphates and muriates : which may be detected thus,

1. If the carbonates are present they may be known by lime water, muriate of barytes, or sulphate of magnesia, producing a white precipitate in a solution of the suspected salt, soluble with effervescence in muriatic acid. Sugar of lead also produces a white precipitate, which effervesces on the addition of muriatic acid, chloride of lead being precipitated.

I would, however, here remark, that if any of the above precipitates be small, and the quantity of fluid large, the effervescence may be hardly, or not at all perceptible, owing to the solution of the carbonic acid in the fluid.

It may happen also, that although the hydriodate is adulterated with the carbonate of potash, yet the white precipitate produced by muriate of barytes, may not be *wholly* soluble in muriatic acid, owing to the carbonate of potash of the shops usually containing some sulphate mixed with it.

2. The *sulphates* (as of soda,) may be detected by a solution of sulphate of magnesia producing no precipitate ; but a solution of muriate of barytes produces a heavy white precipitate, insoluble in muriatic acid. This adulteration is, I believe, very rare.

3. The muriates, according to Chevallier and Robiquet, are frequently present. Indeed, the latter chemist states that they may be one of the results of the operation to form the hydriodate. The peculiar saltish taste would lead us to suspect the presence of either muriate of soda or potash. However, we may determine this chemically.

Add a solution of nitrate of silver to the suspected solution, and a yellowish white precipitate will fall down ; to

which add excess of liquor ammoniæ and stir the mixture. After letting it stand for a little time, filter. If the filtered liquid throw down a white precipitate on the addition of nitric acid, the suspected salt contained a muriate. The theory of this process is very simple. Nitrate of silver throws down in a solution of the pure hydriodate, a yellowish white precipitate of iodide of silver, *insoluble* in ammonia. From the solution of a muriate, the nitrate of silver throws down a white precipitate of chloride of silver, soluble in ammonia. Hence, then, when a solution of nitrate of silver is added to a solution of the hydriodate, adulterated with a muriate, we obtain a precipitate consisting of the iodide and chloride of silver. Ammonia dissolves the chloride but leaves the iodide. When the liquid is filtered and an acid is added, the chloride of silver is precipitated.

The above is the only easy process for detecting the muriates that I have been able to contrive. Robiquet has published one much more complicated and less certain in its results. It is as follows :

“Take a determinate weight, of quite pure hydriodate (suppose ten grains) : take also, the same quantity of suspected salt, dissolve them separately in the same quantities of water ; and introduce them into small tubulated retorts, to which are attached receivers. Introduce into each of these vessels through the tubulure, excess of nitric acid, so as to decompose the hydriodate of potash ; nitrate of potash will be formed and iodine separated. By the application of a sufficient degree of heat, the whole of the iodine may be volatilized. The iodine in each vessel is to be separately dried and weighed. The difference in weight will indicate the purity of the suspected salt. Afterwards the two distilled liquids are to be tested with nitrate of silver. The liquid obtained from the pure hydriodate will not give any precipitate with the nitrate of silver ; whereas that, which arises from the hydriodate adulterated with a muriate, will produce a white precipitate.

See Dict. des Drogues, tome 3; art. Hydriodate de Potassa.

ART. IX.—Some account of the Copperas Mines and Manufactory in Strafford, Vt. By Dr John Locke.

[From the American Journal of Science and Arts, Vol. III. p. 326.]

The mine is situated about twelve miles from Dartmouth College, and about five miles from Thetford, Vt. It is near the summit of a hill which rises probably two or three hundred feet above the bed of the streams in the vallies below.

The gangue in which it occurs is mica slate, the strata of which, are very highly inclined to the horizon, and present their long ridges above the surface in various parts of the hill, particularly at its summit. There are occasionally veins of quartz in the slate. The rocks for several miles around are, as far as I observed, principally mica slate. There are no particular indications of iron at any considerable distance from the mass of the mine, but the transition from the slate to the pyritic ore is abrupt. The mine has been opened obliquely up the hill, about twenty rods in length and four in breadth. The ore has been traced near half a mile, running pretty much in the direction of the strata of the slate.

The ore consists of an aggregate of quartz and undecomposed pyrites in small grains. In its granular aggregation, the ore resembles the quartz and feldspar in fine grained granite. The pyrites constitutes the greater proportion. Many specimens contain abundance of needle shaped crystals of schorl. Its fracture possesses a metallic lustre, and most of it approaches in colour to pale brass, from which it varies to steel gray.

The ore is very compact and is obtained for manufacturing by drilling and blowing. In manufacturing it into copperas it goes through the several operations of decomposition, lixiviation and evaporation, each of which constitutes a distinct operation. For several years the manufacturers effect-

ed the decomposition in the following manner: the ore was broken into fragments of a foot or less in diameter, and heaped upon inclined scaffolds erected and floored with plank for the purpose. Thus exposed to the action of air and moisture, it very gradually decomposes at the surface. Thus from the same mass of ore a solution was obtained, year after year, either by the rains or by the application of water by other means. The solution was received from the inclined scaffolds in plank cisterns.

For three or four years past they have adopted a more expeditious method of decomposition, which was discovered in the first place by accident. They break the ore into much smaller fragments, three inches and less in diameter, and throw them into a convenient heap, taking care to leave air holes at the base, so as to allow the air to pass freely through the heap. On applying water, the decomposition commences, and so much heat is evolved, as presently to raise the temperature of the heap to such a degree as to charr wood, boil water, sublime sulphur, &c. Great quantities of sulphurous acid gas are evolved during the process and in the course of three or four weeks the whole becomes disintegrated and ready to fall into the state of powder. It then, by lixiviation with water, yields all its copperas at once; the process is performed in a plank cistern.

When I visited the mine last summer, one of these artificial volcanoes happened to be burning. The sulphurous acid produced had run down the side of the hill below, and killed the grass and leaves of the trees for several rods, as completely as though they had been scorched by fire. It was even dangerous to approach it, except on the windward side. I thrust a stick into it, and it was charred to blackness in a few minutes. I obtained needle-shaped crystals of sulphur which had evidently been formed on the external surface of the heap by sublimation. I was informed that the sulphur usually melted and ran down into the cavities, and that it frequently burned with flame in various parts of the heap.

The manufactory in which the process of evaporation and

crystallization are performed, is placed on the declivity quite below the mine. This gives great facility to all the operations, allowing the various reservoirs to be so arranged one above another, that the liquor may be transferred from one process to another merely by means of a trough.

The bottoms of the evaporating vessels are of lead, and about ten feet square; the sides are of wood about three or four feet high. The bottom is supported by a number of parallel brick walls, placed at a small distance from each other. The avenues or arches between these walls communicate at one end with the arch in which the fire is placed, and at the other with the common flue.

The ore is a sulphuret of iron, with a small portion of copper; and the solution, first obtained, is a sulphate of iron and copper, with an excess of acid. During the process of evaporation a leaden vessel, having its sides perforated and containing fragments of old iron is suspended in the liquor. The iron, at the same time that it neutralizes the excess of acid, decomposes the sulphate of copper and the copper is precipitated in the form of a fine powder, which the workmen call "copper mud." In a conversation with professor Cleaveland upon this subject, he observed, that he could not conceive why the copper did not form a pellicle upon the iron. I think its detachment is referable to the constant and active operation of the acid in the hot liquor, removing the copper as fast as it is deposited. Hydrogen gas, which I collected in tumblers and burned, is evolved during the solution of the metallic iron in the acid liquor. When the liquor is first heated it becomes turbid with some earthy material, probably alumine.

After the liquor has been sufficiently evaporated it is drawn off into cisterns to crystallize. Branches of trees are put into them as a nucleus for the crystals. When the crystallization has proceeded as far as it will go, the remaining fluid is drawn off, and returned to the evaporating vessels. The cistern remains lined several inches in thickness with crystals, like a geode. The branches have a fine crop

of foliage and fruit, composed of beautiful green crystals. The crystals are very large and perfect, presenting numerous brilliant facets which are often several inches broad. I obtained some which were perfect four sided prisms with a rhombic base six inches in length and half an inch broad.

Every thing about this mineral manufactory is curiously reddened with iron rust. When a dry day succeeds a rain or a shower, the whole mine becomes covered with a white crystalline efflorescence like a hoar frost, and the rain water which runs down into the cavities of the mine becomes so strong a solution as to crystallize. Wherever the solution dribbles from the rocks, or leaks from the cisterns, large stalactites are formed so precisely like icicles that they would not be distinguished from them were it not for their green colour. These stalactites are very numerous at some seasons and present a very beautiful spectacle.

An ingenious method has been contrived to catch the wash of the whole mine. There has been cut in the compact ore, quite across the lower edge of the mine, a channel, into which, by its inclination, the mine discharges the wash of every shower, together with the natural oozing from the hill above. A trough conveys the fluid from the channel to the boilers. To increase the effect of this natural brook of copperas, the ore has been broken into large fragments, and heaped along the upper side of the channel, there to undergo a slow decomposition precisely as it does upon the scaffolds mentioned above.

The mine, where it has not been opened is covered with oxide of iron, which consists principally of incrustations of vegetables.

In the part where I examined these incrustations, they are about three feet deep. The vegetables seem to have been enveloped by a thin uniform crust, but having decayed and disappeared the crust remains an empty mould or pattern of the vegetable. The general figure of the vegetable is pretty well preserved in the external form of incrustation; but the internal cavity is wonderfully perfect, the sinuosities

of the bark, the veins of the leaves and the striæ of the buds are preserved to microscopic minuteness. The impressions are so perfect that it is difficult for one to convince himself that the real vegetable is not there. All the vegetables that we should expect to find upon a given spot of ground, in the woods, seem to occur there. I could, in general, recognize the species, and even the varieties. Among the specimens I obtained, were the following: hemlock branches and cones; nuts, burrs, and leaves of the beech; hazel nuts and species of golden rod which I recognized by a peculiar swelling, often produced upon this plant by an insect. I could not ascertain that any animals had ever been found incrusted. The incrustations are divided into several strata, by layers of oxide, which have a structure so compact as to present a fracture almost or quite vitreous.

The superintendant told me that four men manufactured one hundred tons of copperas in a year, besides carrying on the business of a small farm.

A small quantity of the ore has been found which had undergone a spontaneous decomposition and was thought to be very rich. The superintendant told me, that a barrel of it afforded three hundred and thirty-three pounds of copperas. When I considered the quantity of iron the liquor dissolves, and the water it acquires in crystallization, this statement seemed less incredible than at first.

I have deposited specimens of the gangue of the ore in its various conditions, the crystals, &c. in the New England Museum, Boston.

ART. X.—*On the Action of Acids upon Salicine.* By
Peschier, Pharmacist at Geneva.

[From the *Journal de Chimie et de Toxicologie*.]

Salicine having been acknowledged a crystallizable neutral substance, we had reason to believe that its chemical properties would be confined to this character; but experience has proved to the contrary.

Having been informed by Mr Calloud of Anneci that concentrated sulphuric acid, poured upon salicine, imparted to it a very lively red colour, I wished to ascertain how nitric acid would act upon it, and I was not a little surprised at the result. Immersed in this acid, salicine was soon dissolved and, in the course of about two hours, the liquid concentrated in a porous, yellowish white mass, which, during the night, acquired the form of a mushroom, with edges curled up by scales, placed one over the other, from bottom to top, and furnished with acicular crystals. This mushroom, left exposed to the air, acquires sometimes, in the course of a few days, a pinkish hue, which passes gradually to a lively red. However varied may the quantities of acid be, the results are invariably the same.

Suspecting that these products could not take place without a real combination, I dissolved in water, one of those that contained the smallest proportion of acid. The solution having no action on litmus, I could not otherwise account for it, but that the proportions of the ultimate principles of salicine had undergone a conspicuous change, and that this solution had probably past the alkaline state.

This interesting question induced me to study the action of the different acids upon salicine, and the following are the most striking results I obtained from my experiments.

As soon as salicine is covered with sulphuric acid, it acquires a very lively red colour, which passes to claret, and even to a dirty pink, if there is an excess of acid. Sulphuric acid, diluted with five or six times its weight of water,

does not change the colour of salicine, but it combines with it as it does with the concentrated acid. If, after diluting both these liquids with water, the excess of acid be saturated with the carbonates of soda or potassa, and the liquors be evaporated to the consistence of a syrup, and then treated with alcohol, the sulphate of salicine is dissolved, and the alcoholic solution yields, by evaporation, a salt crystallized in silky prisms diverging from the centre to the circumference, in the process with concentrated acid; and forming a prismatic vegetation climbing to the sides of the vessels in that with diluted acid. These products have a very bitter taste; the former is of a brownish colour and the latter white.

The solution of supernitrate of salicine is yellowish, and possesses the peculiar taste of saffron, united with the bitterness of salicine. Treated in the same way as the supersulphate, it yields colourless crystalline tufts, resting upon a yellowish sediment of the same nature.

Salicine is dissolved by hydrochloric acid, without alteration in its colour, and the solution, submitted to spontaneous evaporation, affords, on the sides of the liquid, small white masses, resembling, as long as they are moist, congealed grease; but exhibiting, when dry, a crystalline appearance.

The phosphoric acid, obtained from the action of nitric acid upon phosphorus, affords prismatic crystals, some with striated faces, others with smooth faces, whilst some may be distinguished among the rest, with two wide and two narrow faces.

Acetic acid yields a salt, forming a handsome vegetation.

From the characteristic form of these salts when carried to the state of perfect neutralization, I had every reason to believe that salicine was converted into an alkaline base, and, in order to ascertain this point, I proceeded to the decomposition of the sulphate of salicine by solution of baryta. After separating the sulphate of baryta thrown down, and ascertaining the absence of this earth in the liquid, I obtained a solution, which brought to the blue colour the reddened

litmus paper, and yielded prismatic crystals, together with small white masses, differing in their forms from those of salicine, and possessing an intensely bitter taste, without, however, partaking of the willow smell that the latter retains.

In order to ascertain with greater precision the total absence of baryta in this product, I evaporated to dryness the mother water, incinerated the matter obtained, and employed all the usual tests for this earth, without discovering the smallest trace of it. Considering that the crystals I had obtained differed, in some very essential points, from the salicine employed in the formation of the sulphate, and that the latter had, altogether or partially, acquired the alkaline properties, I cannot but look upon these facts as evident proofs of the action of sulphuric acid upon salicine.

By decomposing the nitrate of salicine by the carbonates of potassa or ammonia, and separating the soluble nitrate by means of alcohol (permitting the carbonate of ammonia slightly to predominate in the liquid, until evaporated to the point of crystallization), I obtained a liquor of a deep saffron colour, possessing the strong taste of this article, without any alkaline savour; but which, judging from the papillary form of the crystals afforded by it, and from a sort of detonation that took place on their being thrown upon live coals, was nothing else but a nitrate of salicine, whose base had undergone a certain point of decomposition; but the separation of which from the acid had not been affected by the means resorted to.

As to the degree of capacity for saturation that salicine possesses, it is obvious that it is very small, and, probably, that there is but an inconsiderable portion of that substance, treated with acids, that passes to the alkaline state, for it acts on the test paper only when the liquid has acquired a certain degree of concentration. I acknowledge that I would be the first to consider as absurd the possibility of converting salicine into an alkali by the action of sulphuric acid, diluted with five or six times its weight of water, or by that of hydrochloric or phosphoric acids, without the as-

sistance of heat, were it not for changes of a similar nature which take place in the acidification of sugar and gum, and in the conversion of starch into sugar by the action of nitric and sulphuric acids. Consequently the want of experience is, in this instance, the only impediment that can be urged against admitting as a truth the change which has really taken place, for piperine is almost the only substance that has some analogy with salicine, and yet in the supposition that its character would not be altered by the action of acids, what just inferences could be drawn from that circumstance? I know but one mode of deciding this question, that is by a comparative analysis of the ultimate principles of the salicine employed in the experiment, with that of the portion which has been converted into an alkali; but as my occupations do not permit me to undertake the task, I shall see with great pleasure those of my colleagues, who are acquainted with this kind of questions, institute experiments upon it.

E. D.

REVIEW.

The Pharmacopœia of the United States of America. By authority of the National Medical Convention held at Washington 1830. Philadelphia, 1831.

The convention, which framed the National Pharmacopœia of 1820, arranged a plan for the election of another to meet in Washington in 1830, for the purpose of revising the work. By this plan the Union was divided into four sections, each of which was entitled to send three delegates to the convention. The president was required to issue writs of election to the several incorporated medical societies in these respective sections, requiring them to ballot for the three delegates. The several institutions were requested to forward to the president, on or before a certain day, "the *names of three persons, thus designated by ballot*; and the president of the convention is hereby requested on the said day to *assort and count the said votes*, and to notify the three persons who shall have the greatest number of votes of their election," &c. The ambiguity of this provision was the cause of serious difficulty. The societies, in the first part of the sentence, are required to send the *names* of the delegates chosen by them, and it appears to have been the impression in many places, that the delegates thus chosen were to proceed to Washington. The convention however was to consist of but one set of delegates from each section, and the intention was, that the state of the ballot, and not merely its result, was to be sent for examination to the president; and

he was to determine who was elected. It is obvious that, unless a general medical convention be held in each district, for the purpose of choosing delegates, this plan must fail entirely of its design. It might happen that one of the most respectable medical bodies in a district, deeply sensible of the importance of the object in view, and knowing the impossibility of making the revision in a day or a week, had selected a committee of its most competent and accomplished members, to undertake a thorough experimental examination of the subject, devoting to it many months; and that it should afterwards elect these men, thus fitted for the duty, as its delegates, in the full confidence that its voice would be heard in the convention. It might happen after all this preparation, that a more numerous, or more ambitious society in another part of the district should outvote it, and elect a set of deputies unprepared in many respects for the office. It *did* happen accordingly. When the president counted the ballot which had been sent him, he found that three delegates were chosen for the eastern district, consisting of the states east of New York. One of these resided in Boston, one in New Haven, and the other in Berkshire, Mass. For the middle district consisting of the states of New York, New Jersey, Pennsylvania, Maryland, and Delaware, a district in which are situated the three great medical schools of the Union, only one return of *the state of the ballot* was made to him, although the Philadelphia College of Physicians notified him of the *election* of its delegates. The three delegates, declared by him to be chosen from this district, resided, one in Albany, and the other two in New York! From the southern and western districts no returns were made.

The delegates thus appointed, not caring to encounter the fatigues of a journey to Washington, determined to meet in New York on the appointed day. Three, or at most four, of their number met, and finding their body too small to undertake the business, adjourned for six months, and agreed to invite the attendance of delegates from the medical societies throughout the country. The convention, consisting of

ten physicians, was accordingly held, and the product of their joint industry and collected knowledge is before the world. In the mean time delegates elected by the medical societies of New Jersey and Delaware, the Philadelphia College of Physicians, the Medico-Chirurgical faculty of Maryland, and the Medical College of Washington, met at this latter city. They invited the attendance of the Surgeon General of the Army, the senior Naval Surgeon and those members of Congress who were practitioners of medicine. The convention, thus organized, consisted of thirteen physicians. Delegates had been appointed by the medical society of Louisiana, but were detained upon their passage, so that they did not arrive until the convention had adjourned.

The following account of the proceedings of the delegates, and the measures taken by them to secure the proper revision of the work, is too interesting to be omitted or abridged.

"On the fourth of January 1830, the Convention assembled at Washington, the following delegates being present—Lewis Condict, M.D. and Isaac Pierson, M.D. from the Medical Society of New Jersey; Geo. B. Wood, M.D. and Franklin Bache, M.D. from the Philadelphia College of Physicians; John L. Morris, M.D. from the Medical Society of Delaware; James H. Miller, M.D. from the Medico-Chirurgical Faculty of Maryland; and N. W. Worthington, M.D. and Thomas Henderson, M.D. from the Medical College of Washington. The Convention was organized by the appointment of Dr Condict, President, and Dr Henderson, Secretary. As many parts of the United States were not represented, it was resolved, in order as far as possible to supply the deficiency, and to give the various medical interests of the country their due weight, that the Surgeon General of the Army, the Senior Surgeon of the Navy stationed at Washington, and those members of Congress who were practitioners of medicine, should be invited to participate in the proceedings. In compliance with this invitation, the following gentlemen took their seats in the Convention—Joseph Lovell, M.D., Surgeon General; Bailey Washington, M.D.,

Senior Naval Surgeon, stationed at Washington; and Nathan Gaither, M.D. of Kentucky, G. E. Mitchell, M.D. of Maryland, and Samuel Swan, M.D. of New Jersey, members of Congress.

"After the organization of the Convention, its meetings were held in the Capitol; and among the earliest proceedings was the appointment of a Committee to examine and revise the Pharmacopœia, with directions to submit the revised copy at a future meeting. The following report was presented by this Committee.

"The Committee, appointed on the revision of the Pharmacopœia of the United States, beg leave to report, that they have examined a revised draught submitted to them by the delegates from Pennsylvania, with as much attention as their limited time would permit, and recommend it to the Convention as the basis of a new edition of that work. As, however, it contains several important modifications, which require a more particular examination than your Committee can possibly give them, they recommend that it be referred to a Committee of Revision, to be appointed from the different sections of the country; that the chairman of said Committee be requested to open a correspondence with the several members, for the purpose of submitting the aforesaid draught to their examination, and of obtaining their remarks and observations thereon; that he be authorized and instructed to call a meeting of said Committee at as early a period as practicable, to assemble in the city of Philadelphia, and that any three members shall constitute a quorum for the transaction of business; who, after a careful examination of the several communications that may be submitted to them, shall prepare for the press a revised edition of the Pharmacopœia, and make the necessary arrangements for its publication.

"This report was adopted; and it was resolved that the contemplated Committee should consist of a chairman, and of two members from each of the following cities; viz. Boston, New York, Philadelphia, Baltimore, Washington, Charles-

ton, Lexington and Cincinnati. The gentlemen appointed on the Committee were Thos. T. Hewson, M.D. chairman; Jacob Bigelow, M.D. and John W. Webster, M.D. for Boston; Alexander H. Stevens, M.D. and John Watts, M.D. for New York; Geo. B. Wood, M.D. and Franklin Bache, M.D. for Philadelphia; Samuel Baker, M.D. and Elisha De Butts, M.D. for Baltimore; Thomas Henderson, M.D. and N. W. Worthington, M.D. for Washington; John R. Trescott, M.D. and James Moultrie, M.D. for Charleston; W. H. Richardson, M.D. and B. W. Dudley, M.D. for Lexington; and John Morehead, M.D. and Charles E. Pierson, M.D. for Cincinnati.

"The subject which next engaged particular attention was the mode of assembling the Convention of 1840; and the following regulations were adopted as those most likely to secure a full representation.

"1. That the president of this Convention shall, on the first day of January 1839, issue a notice, requesting the different incorporated State Medical Societies, the incorporated Medical Colleges, and the incorporated Colleges of Physicians and Surgeons, throughout the United States, to elect a number of delegates, not exceeding three, to attend a General Convention to be held at Washington on the first Monday in January 1840.

"2. That the several incorporated bodies thus addressed be further requested by the president, to submit the Pharmacopœia to a careful revision, and to transmit the result of their labours, through their delegates, or through any other channel, to the next Convention.

"3. That the several medical bodies be further requested to transmit to the President of this Convention, the names and residence of their respective delegates, so soon as they shall have been appointed; a list of whom shall be published under his authority, for the information of the medical public, in the newspapers and medical journals, in the month of October 1839.

"Considering it necessary to provide against any contin-

gency which might prevent the president from performing the duties thus assigned him, the Convention resolved that in the event of his death, resignation, or inability to act, his duties should devolve upon the secretary, and, should the latter be prevented from serving, upon an assistant secretary to be appointed for the purpose. N. W. Worthington, M.D. was accordingly chosen assistant secretary.

“ Before its adjournment the Convention also provided for the preservation of the records by adopting the following resolutions:—‘ First, that the secretary take charge of, and preserve the existing records, until his successor shall be appointed by the Convention of 1840, when it shall be his duty to hand them over to such successor; secondly, that in case of the death, resignation, or inability to act of the Secretary, his duties shall devolve upon the Assistant Secretary; and thirdly, that it be recommended to future Conventions to appoint their secretary or secretaries from members residing in the District of Columbia.’

“ After the adjournment of the Convention, delegates from the Medical Society of Louisiana arrived at Washington, having been unexpectedly detained upon their passage; and Edward H. Barton, M.D., one of the delegates, after inspecting the draught adopted as the basis of the revised edition, gave it his full approval.

“ The chairman of the Committee of Revision, having received due notice of his appointment, immediately addressed letters to the several members of the Committee, not originally members of the Convention, informing them of their nomination, and of the duties they were requested to perform. Answers to these letters were received from Boston, Baltimore, Charleston, Lexington and Cincinnati, conveying on the part of the writers, in most instances, either an expression of their confidence in the merits of the work, or promises of co-operation in the revision. Manuscript copies of the draught adopted by the Convention were transmitted to Boston, Washington, and Lexington, for the examination of the several members who had expressed a willingness to

participate in the labours of the Committee ; and notice was subsequently sent to them, indicating the eleventh of October 1830 as the day of meeting.

" On the day appointed, the Committee met in the hall of the College of Physicians at Philadelphia. The members present at the first meeting were Thomas T. Hewson, M.D. Chairman ; Thomas Henderson, M.D. of Washington ; and George B. Wood, M.D. and Franklin Bache, M.D. of Philadelphia. On the following day Jacob De La Motta, M.D. of Charleston, appointed by the Medical Society of South Carolina in the place of Dr Moultrie, who had declined, took his seat in the Committee. As the objects of the revision could be accomplished with nearly the same facility by contributions from a distance as by the presence of the members, it was foreseen that, in most instances, this mode of co-operation would be preferred ; and the Convention, to provide against any difficulty which might arise from this circumstance, had determined that three should constitute a quorum.

" The Committee having been duly organized, proceeded to the revision of the work, in which they were assisted by written communications from Drs Bigelow, Webster, and Worthington, absent members, suggesting alterations or additions, many of which, after due consideration, were adopted.* The amendment of the draught having been accomplished, a Committee was appointed, consisting of Drs Hewson, Wood, and Bache, with power to make the necessary arrangements for its publication, and to adopt any modifications, not inconsistent with its general plan and scope, which might be suggested by their own further examination, or by communications which might still be received from others.

" In accordance with the powers granted them, the committee of publication submitted the amended draught to the examination of the Philadelphia College of Pharmacy, by

* After the adjournment of the committee, a communication was received from Dr Dudley, of Lexington, expressing his approval of the draught.

whom, after a careful review by a committee appointed for the purpose, a resolution was adopted, approving the work, and recommending the members of the college 'to use the formulæ thereof in their pharmaceutical preparations.' It is proper to add, that many valuable practical suggestions were received from the Committee of the College, of which advantage has been taken in the final arrangement of the work."

We do not think it worth while to enter here upon the discussion of the *legitimacy* of the two conventions. It is obvious that there was a misunderstanding respecting the arrangements made by the convention of 1820 for the election of that of 1830, and it is also obvious that the claim of the convention which met in New York, on the score of the regularity of its election, must be vitiated by its own proceedings, and the place of its meeting. The convention which met at Washington was legitimate as to the place of assembling, but irregular as to the manner of its election.

We care but little about the matter, and it will not require an extraordinary degree of superiority in either to determine the public voice in its favour.

The convention of 1830 has judiciously taken the *Pharmacopœia of 1820* as its model, altering nothing without a reason for so doing, and considering it as sufficient authority for the general arrangement and plan pursued. It has confined its labours to correcting the errors, pruning the redundancies, and supplying the deficiencies of the original work; and the success with which all this has been done, the close scrutiny, the exact learning, and extensive research displayed in the labour, will fully vindicate the reputation of our country in this department of science.

It necessarily happens that the improvements made from time to time in such a work as the *Pharmacopœia* have an air of minute criticism. This is especially the case with the present revision, in which the alterations are scattered over the volume with a liberal hand, yet are of such a character

that a careless reader would not observe the twentieth part of them.

We open the book at random at the fourth and fifth pages, and will go through the articles enumerated therein in order to give our readers an idea of the manner in which the revision has been made.

Acidum Sulphuricum.

The old Pharmacopœia says,

ACIDUM SULPHURICUM. Acidum sulphuricum.

Sulphuric acid. The specific gravity to that of water as 1.850 to 1.

The present one has it,

ACIDUM SULPHURICUM. Acidum sulphuricum, cuius pondus specificum est 1.8485.

Sulphuric acid. Sulphuric acid of the specific gravity of 1.8485.

Here not only is the specific gravity corrected, but the description is given in Latin as well as in English, and the words "to that of water as—to 1," omitted as unnecessary, and therefore inelegant.

Acidum tartaricum.—This useful, and now much used acid is added to the *materia medica*. It is never prepared by the apothecary in small quantities, and therefore properly belongs here, and not to the "Præparata."

Aconitum.—No alteration.

Adeps.—In the old Pharmacopœia this is merely called *adeps*. It is here, with more precision, defined to be *adeps curata*.

Alcohol.—In the old Pharmacopœia the synonyme is "alcohol." The specific gravity to that of water as 835 to 1000. The latter phrase is altered as in the case of sulphuric acid, and the definition given is, *spiritus rectificatus*.

Allium.—The old Pharmacopœia says the part used is the *root*. The late convention define it with botanical precision to be *bulbus*, the bulb.

Aloe.—The convention has given the *aloe spicata* as the plant yielding aloes. We presume they mean to designate

the *cape aloes* as the officinal species, that being almost the only kind brought to this country. The former convention followed the London college in giving the Socotorine and Barbadoes aloes, and referring the former to the *A. spicata* and the latter to the *A. vulgaris*. In the uncertainty which exists as to the origin of the different species of this drug, no arrangement can be regarded as permanent.

Alumen.—The old Pharmacopœia defined this salt to be super-sulphas aluminæ et potassæ; the present one calls it aluminæ et potassæ sulphas, which is the correct nomenclature.

Ammoniacum.—The old convention defines this to be a gum resin; in the work before us it is simply called *succus concretus*. We have our doubts whether this be an improvement. The English name in the latter is *ammoniac*, in the former it is *ammoniacum*. A recent traveller has discovered, it is said, that both gum ammoniac and galbanum have been referred erroneously to the plants which are here supposed to furnish them.

Ammoniæ muriæ.—The old Pharmacopœia translates this “muriate of ammonia *called* sal ammoniac.” In the present edition the word *called* is omitted as awkward and unnecessary. In the former, the name is repeated in the second column; while in the latter the name is given but once. This remark applies to all the chemical preparations enumerated in the *Materia Medica*.

Amygdala.—This word is translated *almond* in the old Pharmacopœia, *almonds* in the present. Conformably with the practice of ancient Latin authors, the convention has given the names of all articles in the singular number, and has translated them into the plural where our own idiom requires it, as in the present instance. The student, who will compare the two books throughout, will find very numerous corrections of this class.

Angustura.—This bark is referred to *Galipea officinalis* on the authority of Dr Hancock. *Bonplandia trifoliata* is retained as a synonyme.

Anisum, Anthemis, Antimonii Sulphureum, Argentum.
—No alteration.

Aqua.—The apothecary is not restricted to the use of *aqua fontana* as in the last; but is left at liberty to use any sort of clear water for the purpose of distillation; to which operation all the water used in compounding ought to be submitted.

Armoracia.—The old *Pharmacopœia* directed the *whole plant* to be used. The present one more accurately points out the *fresh root* as the officinal part of the plant.

In looking over the *Materia Medica*, we perceive many improvements on the old *Pharmacopœia*. The botanical references are made on the authority of the best authors, and many new articles are introduced to notice, such as Iodine, Lupuline, Hemlock pitch, Rhatany root, the Pith of Sassafras, and Taraxacum.

The definitions also, where they are altered, are generally given with more accuracy. *Elaterium*, for example, instead of being called “*extractum fructus*,” is said to be “*materia fructus succo demissa*.” The “*fruit*” of the “*Cassia fistula*” is ordered to be kept, and not the “*pulp of the fruit*,” as formerly; and the *Colocynth* is directed to be “*the fruit deprived of its rind*” and not “*the fruit deprived of its rind and seeds*.” This is done, we suppose, in order to conform to circumstances, as it is the pod of the *cassia* and the pared melon of the *colocynth* that are always kept in the shops.

We are glad to find that use has been made of the latest authorities, in referring *Senna* to the *Cassia acutifolia*, *obovata* and *elongata*, the three species from which it is indiscriminately obtained; in designating the plants which yield the *Kino*, *Myrrh*, and *Colombo* root; and in assigning their proper places in the botanical systems, to various drugs, such as *Ipecacuanha*, *Cardamom*, *Jalap*, *Iceland moss*, and others.

The botanist will not agree with the convention in calling *Lupuline strobilorum pollen*; nor do we think there will be found many good English *ears* to whom *guaiac* will seem as good an English word as *guaiacum*.

The convention having formed the chemical nomenclature upon the strict principles of the science, ought, we think, to have called Borax *Soda bi-boras*; it is said to be *soda boras*, and in the old Pharmacopœia is called *soda sub-boras*.

It is under the head of "Præparata," that the convention has made the greatest improvements on the old Pharmacopœia. It has rejected many old and unskilful formulæ, has introduced nearly all the new preparations that have been brought into use within the last ten years, and given to the whole of this department a symmetry and precision which entitle the work to a high rank among the best Pharmacopœias extant. In our last number we had occasion to notice the leading defects of the old Pharmacopœia, and it will therefore be unnecessary to say more in relation to them, than that very few appear to have escaped the attention of the convention.

Among the unnecessary and injudicious formulæ expunged from the present revision, are the Black Drop, the place of which is supplied by Dr Hartshorne's acetic tincture of opium; purified Vinegar, the formula for which was an entire failure; five preparations of Antimony; the whole section of Collyria, and many recipes for pills, infusions and decoctions of trifling importance. The space which these occupied is now filled with preparations of more value and importance to the physician, such as the new Alkalies and their salts, and Iodine and its preparations.

As a general standard for the composition of those medicines in which the experience and judgment of the physician must govern the proportions of the active principle, and the choice of adjuncts, the London Pharmacopœia has been followed. In the formulæ which may be calculated upon strict chemical principles, and in those where such properties are involved as the solubility of an active ingredient, the consistence of an ointment, &c. the convention has inserted nothing that was before doubtful, without a full and decisive experiment.

We will examine the first two heads of *Aceta* and *Acida* as an illustration of the manner in which the revision has been made. In doing this we shall make our extracts from the Latin text, in order to compare the latinity of the two works. The *Pharmacopœia* of 1820 was chiefly compiled from those of the three British colleges. Whatever formula was adopted, the language in which it was expressed was also copied, so that the work partook of the inequality of style which marked the three *Pharmacopœias* from which it was compiled. The text of that of London is, however, very far superior in purity of style to the others, and is well known to have been from the pen of the celebrated Dr Thomas Young, one of the most accomplished scholars of the age. The late convention therefore adopted it as their model, and they have successfully laboured in executing this part of their duty; for the style of the Latin text, and we speak the opinion of competent judges who have carefully examined it, is correct and chaste, and a good model for the physicians of our country. We are disposed to attach much importance to this circumstance, as a recommendation of the *Pharmacopœia* to general adoption. The Latin is the universal language of the profession; and it is unhappily too little studied and understood by the majority of American physicians. A critical knowledge of it is indispensable to all who wish to become learned in their profession, and to those who are ambitious of making themselves known to the literary republic of Europe.

A pure and classical Latin *Pharmacopœia*, which shall accustom our physicians to the correct diction of their science, we therefore conceive to be an object of national importance.

To proceed with our examination;—the first article of the preparations is

ACETUM DESTILLATUM.

R. Aceti congium.

Destillet acetum, balneo arenæ, ex retortâ vitrâ in excipulum vitreum. Octario primo rejecto, octarios quinque proximè destillatos serva.

The formula of 1820 stands thus,

ACETUM DISTILLATUM.

R. Aceti octantes octo.

Distillent in vasis vitreis aquæ balneo. Octante primo stillato rejecto, octantes sex proximos serva.

The superior elegance and correctness of expression of the first must be obvious to the tyro in Latin.

The old convention *attempted to improve* both the formula and the latin of the London college. The late convention copied its language and improved its directions. The London throws away the first pint and directs the next six pints to be preserved ; ours, more judiciously preserves only the next five pints, thereby avoiding the empyreuma which always taints the last portions that come over. The old American pharmacopœia directs the distillation to be performed in a water bath, the heat of which is scarcely sufficient for the effectual distillation of the acid.

The black drop is omitted and the Acetum Colchici introduced. The recipe for this is somewhat altered from that of the London College, which directs the use of the recent bulb. Being dependent upon the dried bulb for all our preparations of colchicum, the convention has directed it to be used in the same proportions as the London formula. It is much to be wished that careful experiments were instituted to determine the real and comparative value of recent and dry colchicum. The opinions respecting them are so various, and the vinum colchici, is so uncertain a preparation, as ordinarily made ; that one of the most powerful and efficient remedies in the *materia medica*, which it really is, is in danger of being regarded as unworthy of confidence. With respect to the acetum colchici and the syrup which is prepared from it, we doubt whether either have been much used in this country, nor have we ourselves had any experience of their efficacy. But the *wine* of colchicum has acquired a considerable reputation, which, when care is taken to form a saturated solution, it seldom fails to support. We

do not find fault with the proportions here used in making the vinegar ; our design in these observations is to vindicate the convention from the charge of want of skill in its formula for the Vinum colchici, which is ordered to be made with half a pound of the bulb to a pint of wine. It is, perhaps, a waste of the colchicum, but it makes an uniformly good preparation ; which, in the case of so violent a remedy as the colchicum, it is of the utmost importance to secure.

The progress of improvement is slow, and confidence in new and powerful remedies often grows out of a mere accident. We well remember that a few ounces of sulphate of quinia remained unsold and unnoticed for more than a year in the shop of one of our most eminent apothecaries, until a citizen of some distinction was cured by it of an intermittent fever. He published a statement of the fact, which attracted great attention on account of the epidemic that then prevailed ; and from this circumstance the fortunate individual of whom he purchased it sold many thousand dollars' worth of the new medicine. The active principle of the colchicum is kept in all our principal shops; it is uniform in its qualities, unalterable by age, and its strength can be relied on with the greatest certainty. Are we to wait till some fortunate accident such as we have related shall dispel the fears entertained respecting it, and induce our physicians to substitute Veratria, an uniformly active medicine, for one liable to such changes as the colchicum ?

The Acetum Scillæ of the old work is taken from the Edinburgh ; that of the revised code is a copy of the London and Dublin recipe, excepting that the quantity of alcohol is lessened to correspond with that ordered by the London College in the acetum colchici. We think both alterations judicious ; the proportion of squill is that in common use, and with respect to the alcohol the less that will answer the better. The time of maceration is also changed from one to seven days.

The following is the recipe for acetic acid.

ACIDUM ACETICUM.

R. Soda acetatis in pulverem triti libram :
Acidi Sulphurici libram dimidiam.

Acidum sulphuricum retortæ vitree infunde, eique sodæ acetatem paulatim ad-
jice; dein balneo arenæ, igne modico, acidum aceticum destillet, donec residu-
um siccum fiat. Hujus acidi pondus specificum est 1.0634.

This formula is undoubtedly a very good one; we wish the convention had stated, in addition to the specific gravity of the acid, the quantity of carbonate of lime which it will dissolve; for it is peculiar to this acid that the same specific gravity is indicated by an acid of double the strength of the above preparation. This pure and concentrated glacial acid may be obtained by driving off the water of crystallization from the acetate of soda previous to distillation. An article of the strength of the above is made by the English chemists, and labelled Concentrated pyroligneous acid No. 11.

Dilute acetic acid of the strength of good vinegar is made by diluting the above with ten parts of water.

Both the above preparations are newly introduced.

The directions for making Benzoic acid are those of the London College; which are neater than those of the Dublin, that were copied in the old Pharmacopœia.

The convention terms the Prussic acid of the old Pharmacopœia, Hydrocyanic acid, and adopts the mode of preparation contrived by Vauquelin; the old formula was that of Scheele, which is by no means uniform in its results. The method of Vauquelin is the most simple, and has the sanction of the Paris Codex in its favour. The apothecary who prepares it must take care to test the acid for any undecomposed cyanide of mercury, which may remain, and to subject the solution to the action of a *plentiful* stream of Hydrosulphuric acid.

The convention has introduced the common Elixir of vitriol under the name of Aromatic Sulphuric Acid, instead of Tincture of sulphuric acid, by which the former convention designated it. The recipe and the title are both taken from the Edinburgh Pharmacopœia, and we think the original

name decidedly preferable. The Edinburgh College directed it to be made with two pounds of alcohol, and half a pound of acid; or one part in four; the old convention, changing pounds into measures, directed two pints of alcohol, and three fluid ounces of acid, or one part to about 4.8; the late convention, retaining the fluid ounces and desirous of returning to the strength of the original recipe, have ordered, three and a half fluid ounces of the acid, which is one part to about 4.15. We confess we should prefer going back altogether to the original receipt, of which the aliquot proportions are a strong recommendation.

In the old Pharmacopœia no uniform arrangement of the written formulæ was adopted. In the recipe for elixir of vitriol for example, the acid and the alcohol are first directed; the apothecary is told to digest them together; then follow the names and quantities of the aromatics used, and the direction for proceeding with them. The "Mel Scillæ compositum" is another example of this mode of prescribing, for the tartar emetic which it contains is mentioned in the directions for the mode of preparation, and may easily escape the attention of the physician. The late convention has returned to the mode of prescribing adopted in the best models abroad; namely, of reciting the names and quantities of every article in the compound, and then writing underneath the manner of mixing them.

Dilute sulphuric acid is altered back to the London standard. The old convention intended to adopt the Edinburgh formula, but altered the weights as usual to fluid ounces without making the requisite allowance for specific gravity. It thus made a diluted acid of twice the strength of any of the British formulæ.

We might readily go through the whole work in this manner, and there is scarcely a section of it which does not furnish matter for equally copious criticism. What we have said is, however, sufficient to indicate the thorough manner in which the revision has been made, and we must confine

ourselves to remarks of a more desultory and general character.

The omission of the old convention to rectify its sulphuric ether is here corrected.

A formula for preparing Spirit of Nitrous Ether, which has long been in use among manufacturing chemists, and adopted in the Pharmacopœias of Germany, is introduced. It is a far better and safer process than the old one, which it must entirely supersede.

The formula for *Aqua ammoniæ* is that of the Edinburgh College, the gas being distilled over and washed previous to its absorption, thus securing the absolute purity of the solution. The old process was that of the London College which put all the water into the retort, and distilled over a certain quantity. It is scarcely possible by this mode to obtain a solution free from muriate of ammonia. The specific gravity of the product is stated to be .944, which is equivalent to 14.5 per cent of alkali. This is stronger than the *liquor ammoniæ* of the London College, which contains about 9.6 per cent of alkali, although weaker than that of the other colleges which contains nearly 16 per cent. It will be found upon examination that the process is also more economical; that in the process here adopted 23 per cent only of the ammonia contained in the muriate is lost, while in that of the Dublin the loss is 42 per cent, and in that of the London College, 54 per cent.

The *Hydrosulphuret of Ammonia* is prepared with gas, procured by the action of dilute sulphuric acid on sulphuret of iron.

The solution of *Carbonate of ammonia* of the old Pharmacopœia was an unskillful preparation; we are glad to find that it no longer encumbers the work.

The Dublin process for *Tartar Emetic* is given in place of that of Philips, which was adopted by the old convention.

Antimonial wine is made with two grains to the ounce, in order to agree with the recipe of the London and Dublin Colleges.

We copy the recipe for *Aqua Cinnamomi*, as an example of the improved mode of saturating water with essential oils.

R. Olei Cinnamomi fluidrachmam dimidiam ;
Magnesiæ drachmam dimidiam ;
Aquaæ Destillatæ octarios duos.

Oleum Cinnamomi primūm cum Magnesiâ tere, deinde cum aquâ paulatim instillatâ, et per chartam cola.

The Confection of Opium is restored to its place in the Pharmacopœia ; the confection of red roses is made with the Rosa Gallica, and the confection of orange peel with the peel grated, and not entire.

Under the head of Emplastra, we are glad to see the Emplastrum Galbani compositum restored to its place ; and wish the same care had been extended to Emplastrum Thurius, which is an excellent adhesive composition. We notice several improvements in the preparations of Iron, such as the introduction of the sulphuret and sulphate, the omission of several obsolete preparations, and the correction in the proportions used for making the phosphate, and the tincture of the muriate.

The preparations of Mercury have undergone but little change, except in the nomenclature, which is made to correspond with the present state of science. The formula of the last edition of the London Pharmacopœia is adopted for Calomel ; being a shorter process than that of the former edition, although founded on the same principles. We recommend for practice, the mode of preparing Cyanuret of mercury, recently contrived in Europe. It consists in decomposing the Ferro-cyanate of Potassa by sulphuric acid, and passing the disengaged gas through water, in which finely powdered red oxide of mercury is suspended. It is more economical and neater than the process of the Pharmacopœia, and equally certain in its result.

The following formulæ are either new, or so much improved as to be greatly increased in value.

LINIMENTUM SAPONIS CAMPHORATUM.

R. Saponis Vulgaris uncias tres;
Camphoræ unciam;
Olei Rosmarini,
Olei Origani, singulorum, fluidrachmam;
Alcoholis octarium.

Camphoram cum Oleis in Alchole liqua; dein Saponem adjice, et digere, balneo arenæ, donec liquetur. Hoc Linimentum frigefactum spissitatem habet unguenti mollis.

MORPHIA.

R. Opii concisi libram;
Aquaæ Destillatæ octarios sex;
Alcoholis congium;
Aquaæ Ammoniæ fluiduncias sex.

Opium macera cum Aquaæ Destillatæ octariis quatuor, in vase vitro, per dies sex, sæpius agitans; dein per chartam cola. Residuum Aquâ reliquâ lava, et cola ut anteâ. Liquores colatos inter se misce, hisque adjice primùm Alcoholis octarios quinque, dein Aquaæ Ammoniæ fluiduncias tres, Alcoholis octario dimidio prius immistas. Post horas viginti quatuor infunde quod reliquum est Aquaæ Ammoniæ, Alcoholis octario dimidio ut anteâ immistum; et liquorem sepone per diem unum ut fiant crystalli. Has, ut puræ sint, cum Alchole reliquo coque donec liqueantur, liquoremque adhuc calidum cola, et sepone.

MORPHIÆ SULPHAS.

R. Morphiæ in pulverem tritæ unciam;
Aquaæ Destillatæ octarium dimidium;
Acidi Sulphurici Diluti quantum satis sit.

Morphiam cum Aquâ misce; dein Acidum paulatim instilla, assiduè movens, donec Morphia saturetur et liquetur. Liquorem balneo aquoso consume, ita ut dum frigescit fiant crystalli. Has super chartam bibulam exsicca.

LIQUOR MORPHIÆ SULPHATIS.

R. Morphiæ Sulphatis grana octo;
Aquaæ Destillatæ octarium dimidium.
Liqua Morphiæ Sulphatem in Aquâ Destillatâ.

PILULÆ COPAIBÆ.

R. Copaibæ uncias duas;
Magnesiae recentè paratæ drachmam.
Misce, et sepone donec fiat massa ad pilulas singendas idonea; deinde in pilulas ducentas divide.

LIQUOR PLUMBI SUBACETATIS.

R. Plumbi Acetatis,
Plumbi Oxidi Semivitrei, singulorum, uncias octo;
Aquaæ Destillatæ octarios duos.
Misce in vase vitro, et coque per tertiam horæ partem; tum per chartam cola.

POTASSII IODIDUM.

POTASSÆ HYDRIODAS.

R. Liquoris Potassæ octarios duos;

Iodini quantum satis sit.

Liquori Potassæ, calore leni adhibito, paulatim adjice Iodini quantum satis sit ad Potassam saturandam, coloremque fuscum liquori impertiendum. Deinde Acidum Hydrosulphuricum per liquorem, in vase idoneo, transmitte, donec color fuscus evanescat, et Acidi Hydrosulphurici odor in liquore permaneat. Tum per chartam cola, et aquâ calidâ residuo affusâ, iterum cola. Liquorem colatum paullisper coque ut Acidum Hydrosulphuricum vaporatione separetur; tum sulphur, si quid demissum fuerit, remove, et acidum, si quid adsit, Liquore Potassæ satura. Denique liquorem decoque donec sal exsiccatus fuerit.

Acidum Hydrosulphuricum obtinetur ex Ferri Sulphureto, et Acido Sulphurico quadruplicem aquæ pondere diluto.

SYRUPUS ACACIÆ.

R. Acaciæ Gummi uncias quatuor;

Sacchari libram;

Aquæ bullientis octarium.

Liqua Gummi in Aquâ; tum Saccharum adjice, et coque ut fiat syrupus.

SYRUPUS ALLII.

R. Allii recentis concisi uncias duas;

Aceti Destillati octarium;

Sacchari libras duas.

Allium macera in Aceto, in vase vitro, per quatuor dies; dein expime, et seponere ut fæces subsidant; denique in liquore defæcato Saccharum liqua eodem modo quo de Syrupo præceptum est.

SYRUPUS RHEI AROMATICUS.

R. Rhei contusi uncias duas cum semisse;

Caryophylli contusi,

Cinnamomi contusi, singulorum, unciam dimidiam;

Myristicæ contusæ drachmas duas;

Alcoholis diluti octarios duos;

Syrupi octarios sex.

Rheum et aromaticæ macera in Alcoholæ Diluto per dies quatuordecim, et colla; dein liquorem, balneo aquoso, consume ad octarium, et adhuc calentem cum Syrupo calefacto misce.

SYRUPUS SARSAPARILLÆ.

R. Sarsaparillæ contusæ libras duas;

Guaiaci Ligni rasi uncias tres;

Rosæ Gallicæ,

Sennæ,

Glycyrrhizæ contusæ, singulorum, uncias duas;

Olei Sassafras,

Olei Anisi, singulorum, minima quinque;
Olei Gaultheriae minima tria;
Sacchari libras octo;
Alcoholis Diluti Octarios decem.

Macera Sarsaparillam, Guaiaci Lignum, Rosam, Sennam, et Glycyrrhizam in Alcoholè Diluto per dies quatuordecim; dein expime, et per chartam cola. Tincturam, balneo aquoso, consume ad octarios quatuor cum semisse; tum Saccharum adjice, et liqua ut fiat syrpus. Huic frigefacto adjice Olea priùs cum exiguo syrapi contrita, et misce.

TINCTURA IODINI.

R. Iodini unciam dimidiam;
Alcoholis octarium dimidium.
Iodinum liqua in Alcoholè.

TINCTURA LUPULINÆ,

R. Lupulinæ uncias quatuor;
Alcoholis octarios duos.
Macera per dies quatuordecim, et per chartam cola.

TINCTURA OPII ACETATA.

R. Opii uncias duas;
Aceti fluiduncias duodecim;
Alcoholis octarium dimidium,
Opium tere cum Aceto; tum, Alcoholè adjecto, macera per dies quatuordecim, et per chartam cola.

UNGUENTUM HYDRARGYRI NITRATIS.

UNGUENTUM CITRINUM.

R. Hydrargyri Purificati unciam;
Acidi Nitrici fluidrachmas undecim;
Olei Bubuli recentis fluiduncias novem;
Adipis uncias tres.

Hydrargyrum in Acido liqua; dein Oleum et Adipem simul liquefac, et cum primùm lentescant, liquorem adjice, et misce.

We are warned by the length to which this Review has been extended, that it is time to draw to a close without noticing all the changes and improvements which we have marked for criticism. We have said enough to establish the correctness of the opinion we have more than once expressed, of the great superiority of the present over the former *Pharmacopœia*. It is, as a Latin composition, written in a correct and pure style; the language of the American trans-

lation is clear and concise: there is great symmetry in the arrangement and in the formularies; the chemical and natural history departments have been prepared with learning fully adequate to the task; the pharmaceutic part is neat and elegant; and we are not able, after the closest scrutiny, to point to a single typographical error.

Before we conclude we cannot withhold the expression of an honest pride and satisfaction, in perceiving how much the Journal of the College of Pharmacy has contributed to the improvements adopted in this revision of the Pharmacopœia. The convention has introduced into it, with slight variations, Thomas Evans's formula for the Black Oxide of Mercury; E. Durand's Aromatic Syrup of Rhubarb; Dr Staple's process for obtaining Morphia; D. B. Smith's formula for Syrup of Garlic and Extract of Lead; W. R. Fisher's for Citrine Ointment, and W. Hodgson, Jun.'s for the Compound Syrup of Sarsaparilla. We wish they had also adopted the process given in Franklin R. Smith's paper on Bi-carbonate of Soda, which is that used by the manufacturing chemists, and is very far superior to the old mode of preparation.

We trust, that before the return of the period for a third revision of this truly national work, the progress of Pharmaceutic Science in our country will be such, that every department of the Pharmacopœia will undergo a thorough experimental examination, so that the materials, for a more complete and rigid reformation than even the present, will be at hand, for the use of the convention to whom the delicate task may be entrusted.

MISCELLANY.

Alkaline Extract of Jalap, by E. Durand.—Dr Reese, in his work upon costiveness, speaks highly of an alkaline extract of jalap, prepared at the Medical Hall, 170 Piccadilly, London, as the medicine which agrees best with the stomach and small intestines, and to promote fecal secretions of the colon, without irritating the rectum. He gives no recipe for the preparation of this article; but mentions only that it is obtained by gently evaporating, in a water bath, an infusion of jalap in proof spirit, with the addition of a small quantity of carbonate of potassa to prevent the separation of the resin from the gum, on the evaporation of the aleoholic menstruum.

Having been requested by several physicians to prepare some of this extract, I operated in the following way: I digested for several days, at a common temperature, two pounds of pulverized jalap in one gallon of alcohol of 22° of Baume's areometer; I strained and filtered the liquor which I evaporated slowly, in a water bath, to the consistence of a pilular extract; adding, from the beginning, small portions of carbonate of potassa, every time the resin began to separate from the liquid. The whole amount of alkali used was about twelve drachms.

I obtained thus seven ounces and a half of a beautiful extract of a reddish brown colour, possessing an alkaline taste; but none of that nauseous, irritating sensation peculiar to the powder or tincture of jalap. As the first part of this operation was made rather hastily, the action of the alcohol was not sufficiently protracted to enable me to obtain all the soluble principles of the jalap; otherwise, I doubt not, that the result would have been nearly double, for the jalap, submitted anew to the action of three quarts of alcohol, yielded a tincture nearly as strongly charged as the first.

The alkaline extracts of jalap and rhubarb may become highly interesting remedies in cases where saline purgatives and drastic or aleoholic preparations are to be avoided; it is a well known fact that resinous purgatives, united with soap or alkalies, act more gently and efficaciously, and without irritating the stomach and intestines. The soaps of aloes, scammony, jalap, &c. have of late been in great use in Europe; they are generally prepared by dissolving in alcohol one part of resin with two parts of soap and evaporating. The direct *saponification* of resin by the carbonate of potassa would have the advantage of containing more of the active principles in a given quantity than in the above soaps.

Dr Reese administers this extract in the form of pills of three grains each, taken one, two or three, as the case requires, every night or every other night. Dr Horner has exhibited it with success, according to the following direction:

R. Alkaline extract of jalap,
Syrup of ginger,

2 drachms.
2 ounces.

f. sol. one spoonful at a time.

[*This article came too late to be inserted in the department of original matter to which it properly belongs.—ED.*]

On the Chloroxalic Acid.—At a meeting of the Royal Academy of Sciences held on the 17th of September last, M. Dumas read a memoir on a new compound, which he calls *chloroxalic acid*, obtained from the action of an excess of dry chlorine upon crystallizable acetic acid, under the influence of the solar rays*. We shall now give a circumstantial account of this discovery.

When dry chlorine is introduced into a bottle containing a small quantity of concentrated acetic acid, and the vessel is exposed to the solar rays in clear weather, white vapours are soon perceived condensing into a liquid that runs by drops along the sides of the glass. Chlorine disappears, and in fifteen or twenty minutes, if there is an excess of acid and if the sun is very hot, the bottle becomes perfectly transparent. In this case, when the stopper is taken off, the vessel is found to be filled with hydrochloric acid and a very penetrating vapour; but the other products generated cannot be easily separated from the excess of acetic acid. When, on the contrary, the acetic acid is used in a quantity less than is necessary to destroy all the chlorine, a new product is obtained, besides hydrochloric acid, which crystallized on the sides of the bottle.

If the vessel be exposed the whole day to the solar rays, crystallization takes place towards evening or during the night. These crystals settle in the shape of fern leaves, or they are distinct and isolated. They are colourless and in rhomboidal laminæ sometimes half an inch broad. In order to get them out of the bottle, M. Dumas introduces, by means of a bellows furnished with a long tube, a sufficiency of air to expel the excess of chlorine and hydrochloric acid gas. The vessel is then washed with a small quantity of distilled water, which is evaporated in the vacuum of an air pump, by placing near it two vessels filled, one with quick lime, and the other with sulphuric acid. The product yielded by this evaporation is a white crystalline mass constituting the new compound, which could not be obtained by evaporation in the free air, on account of its great deliquesce. The evaporation by heat would fail likewise, because the heat and the presence of water would partially decompose it, and it is exceedingly volatile.

Finally, if the experiment were made in a vessel containing a notable excess of acetic acid, no product would be afforded, even when the chloride generated an abundance of crystals on the sides of the glass. The excess of acid causes the mass to remain liquid for a long time in the vacuum of the air pump. The presence of the new compound is easily recognized by the smell; but crystallization is incomplete or null even after two weeks; whilst, if the product is well prepared and without excess of acetic acid, it takes place in a few hours.

By introducing more chlorine in the vessel that contained an excess of acetic acid

* The hydrated acetic acid may be considered as a compound of equal volumes of hydrogen and oxide of carbon. M. Dumas suspected that by the reaction of chlorine upon that body, hydrochloric acid and a compound of chlorine and carbon would be produced. The expectations of this chemist have been realized.

and exposing again to the action of the solar rays, we may sometimes succeed in obtaining the new compound, but, generally, crystallization does not take place easily. The proportions adopted by M. Dumas are the following : a *litre* (a little more than the English quart) of dry chlorine to nine *decigrammes* at most (13.8996 grains) of crystallizable acetic acid of 14° or 15° + 0. Chloroxalic acid is not always obtained in a state of purity from the first crystallization ; it is, generally contaminated with oxalic acid, from which it is separated by exposure to a temperature of 45° to 50° centigrade (113° to 122° Fahr.) ; it fuses at this point, whilst the oxalic acid remains solid. The liquor is now filtered and placed in the vacuum of the air pump for a few hours. It recrystallizes ; but yet it retains sometimes a small quantity of oxalic acid.

Chloroxalic acid is solid, crystallizes in rhombs with angles from 80° to 100° ; it is exceedingly deliquescent and affords by distillation some hydrochloric acid, carbonic acid gas and a carbonous sediment. A part of it passes without decomposition. This substance is composed, according to M. Dumas's analysis, of

Chlorine,	1 atom	48.8 parts
Carbon,	2 do	16.6
Oxygen,	2-3 do	33.2
Hydrogen,	1 do	1.4
		100.0

It is purely white and inodorous ; but leaving upon the tongue a burning sensation with hardly any discernible taste of acid ; the tongue becomes white all at once as with oxygenated water. When the first impression is over, it leaves behind an aromatic bitter taste. The chloroxalic acid exercises a powerful reaction upon vegetable colours ; it is liquid at about 45° cent (113° Fahr.) and crystallizes at 1 degree below that (2° Fahr.). Melted and permitted slowly to cool, it forms voluminous rhomboid crystals. Heated in the vacuum, it boils at 200° cent. (392° Fahr.) and volatilizes wholly in white vapours, which crystallize instantly on the sides of the bell, as a brilliant hoar-frost ; its point of ebullition, under the ordinary pressure, must, consequently, be 300° cent (572° Fahr.). It reddens litmus, and dissolves easily in ether which takes it up from its aqueous solution.

The chloroxalates are very soluble ; M. Dumas has investigated the properties of several of these salts ; but he thinks they are not sufficiently interesting to be submitted to the academy.—*Journal de Chimie et de Toxicologie, communicated by Julia Fontenelle.*

E. D.

Meeting of the Parisian Society of Pharmacy.—On the 11th of August last, M. Charlot made known to the society, that he had succeeded in bleaching and disinfecting rancid, faulty substances, by means of the chlorides of the oxides of calcium and sodium.

M. Guesneville, Jun. announced that he had discovered an easy method for separating the osmium and iridium from the platinum ore. He introduces into a porcelain tube which he carries to red heat, the black residue left by the hydrochloric acid, and treats it with a current of chlorine. The osmium and iridium are converted into chlorides and sublime. He then takes advantage of the difference of their degree of solubility to separate them.

On the 13th of October, a letter from Mr Rose of Berlin to MM. Robiquet and Serullas announces that a crystallizable principle has been obtained by M. Bistok from the colombo root. This product is intensely bitter, and has much the appearance of asparagine ; it crystallizes in hexahedral prisms.

French Institute.—At a meeting of the institute, held the 18th October, M. Gay Lussac read a letter from M. Leroux, containing a new process for preparing salicine more easily than that published some time ago. He presented, at the same time, a bottle full of this febrifuge article, and announced that M. Leroux will be able to furnish tolerably large quantities of this substance, at the rate of five francs per ounce.

Mode of discovering the quantities of Alkaloid contained in the Barks of the Cinchona, by Viltman.—This process has, according to its author, the advantage of enabling the operator to experiment upon minute quantities and unites a great degree of precision to a tolerably easy execution. Fifty-five grains of finely pulverized bark are mixed accurately with an equal quantity of washed quartz sand, of half the size of a poppy seed. To this mixture are added five drops of hydrochloric acid, and twenty drops of alcohol, and the whole pressed gently into a glass tube four or five inches long, and about five lines diameter, one of the ends of which is closed with a piece of muslin, in the form of a small sieve, and plunged into a close vessel. This tube communicates, by means of a bent tube, with a small matrass, filled with a mixture of one ounce and a half of alcohol, and twenty drops of hydrochloric acid. The diameter of the bent tube must be about four-fifths of a line, and one of the ends must go to the bottom of the matrass, whilst the other must not go farther down than the surface of the mixture of bark and sand. The alcohol contained in the matrass is carried to ebullition by means of a small spirit lamp, and extracts in this manner all the soluble parts of the mixture in the great tube. If this ebullition is slow, the last drops of alcohol come out colourless.

The alcoholic tincture, of a brownish red colour, is precipitated with hydrated lime. After the lapse of twelve hours, the precipitate is separated by means of a filter; the alcoholic solution is then rendered very slightly acid, and reduced by evaporation to a soft resinous matter, which is dissolved in two drachms of distilled water, and then precipitated by a few drops of caustic ammonia. The precipitate is dried, and indicates the quantity of alkaloid contained in the bark.

By means of this process, Mr Viltman has found that:

100 parts of Carthagena bark contain	3,30	parts of alkaloid,
100 " Huantro bark "	3,5	" cinchona,
100 " Royal or Calysaya "	5,0	" quinia,
100 " Red bark "	6,0	" quinia and cinchona.

Journal de Chimie et de Toxicologie.

Alcoolatures or Tinctures, prepared with Vegetable Juices.—We find in the Journal de Pharmacie for November 1830 some formulæ for preparations that are out of the ordinary track, and as every thing relating to improvements or changes in pharmacy is interesting, we give them an insertion in our Journal.

The author (un inconnu) observes that as by desiccation, certain plants lose part of their most volatile principles or undergo changes in their composition, it is certain that their medicinal action cannot be the same as it was before drying. Tinctures being usually made from these dried articles cannot therefore be possessed of the primitive properties of the substances, of which they are composed. This fact is the more worthy of consideration, since the desiccation of plants is in a great measure performed by persons who are ignorant of pharmacy, and they are thrown into market in a truly lamentable state of deterioration.

These considerations furnish sufficient argument in favour of employing the tinctures prepared with alcohol, and the vegetable juices. In these new tinctures as

well as in the old ones, it is the "hydralcool," or diluted alcohol, of 22° B. that is employed as the menstruum. By evaporation these alcoholatures furnish extracts less alterable than those obtained by the direct concentration of the juices. The addition of alcohol to a filtered juice determines a precipitate more or less abundant, of which the colour varies according to the species of juice submitted to its action: thus the poisonous sumach furnishes a beautiful white precipitate.

In order to distinguish these tinctures from those prepared with the vegetables entire, the author proposes for them names entirely distinct. Thus he gives the name of *alcoolature of the juice of cicuta* to that prepared by a mixture of equal parts of the juice of this plant and alcohol; while that made with the leaves themselves bears the old title of *tincture of cicuta*.

The alcoholatures are not designed to replace the ordinary tinctures; they constitute a distinct class, the operation of which ought to be separately studied.

FORMULÆ.

Alcoolature of the Juice of Belladonna.

R. Rectified alcohol of 35°;
Recent and filtered juice of belladonna, each 1 part.

Alcoolature of the Juice of Digitalis.

R. Rectified alcohol of 35°;
Recent and filtered juice of digitalis purpurea, each 1 part.

Of Hyoscyamus.

R. Rectified alcohol of 35°;
Recent and filtered juice of the leaves of hyoscyamus, each 1 part.

Of the Juice of Tobacco.

R. Rectified alcohol of 35°;
Recent and filtered juice of the leaves of the *nicotiana tabacum*, each 1 part.

There are several others which follow these, but as the principle and proportions are the same in all, it is unnecessary to translate them. There appears to be an oversight with respect to the strength of the alcohol. In the remarks it is stated that it should be the hydralcool of 22° B., while in the formulæ it is uniformly directed of 35°.

On Nitrate of Silver as a test for detecting the presence of minute quantities of vegetable and animal matters in water.—Nitrate of silver dissolved in pure water is not altered by the sun's rays. If the minutest quantity of vegetable or animal matter is present, the solution is discoloured; and with common distilled water, the discolouration is strong. To prove that the ease of the change of colour is the one assigned, it is sufficient to allow the coloured matter to subside, decant the colourless solution, and expose it again to sunshine. However powerful the sun's rays are, no further effect is produced; but add more common distilled water, and the phenomenon will instantly reappear.

Note to the Article on Ichthyocolla.

[Ante, page 22.]

Owing to the lateness of the period at which it was written, this paper was sent to the press in an unfinished state. It is proper to add that the *weak fish* is the *Squeteague* of the Narragansett Indians, and the *Labrus Squeteague* of Dr Mitchell's paper on the fishes of New York. The Doctor notices that "its swimming bladder is convertible into good glue," and adds in his characteristic manner, "I have eaten as fine blanc mange from it as from the isinglass of the sturgeon."

In the paper of Humphrey Jackson which I have quoted, it is stated "it is now no longer a secret that our lakes and rivers in North America are stocked with immense quantities of fish, said to be of the same species with those in Muscovy, and yielding the finest isinglass; the fisheries whereof, if duly encouraged, would doubtless supply all Europe with this valuable article. It is further said, "that in consequence of public advertisements distributed in various parts of North America offering premiums for the sounds of sturgeon and other fish, for the purpose of making isinglass, several specimens of fine isinglass, the produce of fish taken in those parts, have lately been sent to England, with proper attestations as to the unlimited quantity which may be procured."

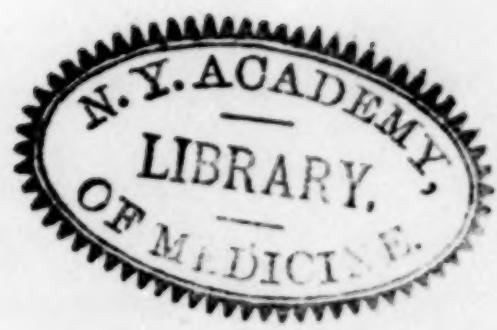


Fig. 1.



Fig. 1.

Fig. 2.



Fig. 2.

SANGUINARIA CANADENSIS.
(Blood-root. Puccoon.)

